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Bianca Preda-Bălănică and Marja Ahola

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Front Cover

Silver hair rings from Kamen – *Gabrova Mogila*, Sliven region, Bulgaria.
Courtesy of Diana Dimitrova and The National Archaeological Institute with Museum – Bulgarian Academy of Sciences, Sofia. Photo credit: Krasimir Georgiev

Back Cover

Bronze Age burial mound from Prahova County, Romania.
Photo credit: Bianca Preda-Bălănică

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Contents

BIANCA PREDA-BĂLĂNICĂ – MARJA AHOLA
Preface 7

ALEXEY G. NIKITIN – SVETLANA IVANOVA
Long-distance exchanges along the Black Sea coast in the Eneolithic and the steppe genetic ancestry problem 9

NATALIA SHISHLINA – ALEXEY KAZARNITSKY – NADEZHDA LEONOVA – OLGA KUZNETSOVA – VYACHESLAV SEVASTYANOV
Yamnaya group from the Peschany IV burial ground in the Lower Don Eurasian steppes: local or non-local? 29

VALENTIN DERGACHEV
Budzhak "Culture" through the prism of the cartographic method 45

CRISTIAN EDUARD ŞTEFAN – GABRIEL VASILE – RADU PETCU – ANDREI HEROIU – BIANCA PREDA-BĂLĂNICĂ – MARTIN TRAUTMANN
The Bronze Age mounds from Aliman (Constanţa County, Romania) 95

STEFAN ALEXANDROV
More about a particular group of Early Bronze Age barrow graves in Hocker position from North-East Bulgaria 135

MASAO SEMMOTO
Tracing the root of cord decoration on Early Bronze Age pottery in Upper Thrace 163

TODOR VALCHEV
Foreign-local interactions during the Early Bronze Age in the valley of Tundzha River and the new ways of presenting prestige 191

HORIA I. CIUGUDEAN – COLIN P. QUINN – CLAES UHNÉR – JESS BECK
From West to East and East to West: Yamnaya Migration and Interaction with Copper Age/Early Bronze Age Carpathian Communities in Transylvania 205

JAROSLAV PEŠKA
East European elements in burial rites of the Moravian Corded Ware Culture. Wagon burial in Moravia in the 3rd millennium BC? 247

SEBASTIAN SCHULTRICH
The Emergence of the Corded Ware Culture in Northern Central Europe 281

HENK VAN DER VELDE – NIELS BOUMA
Change or continuity in burial traditions between the TRB period and the Corded Ware culture? The case of Dalfsen, a Neolithic burial ground in the Netherlands 305

List of contributors 323

Preface

This volume, the fourth of the *Yamnaya Impact on Prehistoric Europe Series*, represents the proceedings of an EAA session held in 2020. The 26th Annual Meeting, initially planned to take place in Budapest was transformed into the first Virtual Meeting organised by the European Association of Archaeologists due to the Covid–19 pandemic. The session had the title *#196 No man travels alone, he takes himself along: Yamnaya transmission and/or transformation during the 3rd millennium BC Europe*, and was co-organised by the two editors of this volume together with colleagues Todor Valchev from the Yambol Regional Historical Museum (Bulgaria) and Piotr Włodarczak from the Institute of Archaeology and Ethnology of the Cracow branch of the Polish Academy of Sciences (Poland).

The idea of the session emerged from critical debates around the arrival of the Yamnaya steppe populations in southeastern Europe at the end of the 4th and the very beginning of the 3rd millennium BC. Current research, especially fuelled by recent aDNA studies, suggests that large-scale migration took place and triggered irreversible processes of change in biological ancestry and culture in Europe. A clear-cut scenario has been popular in the past couple of years: the Yamnaya came, conquered the locals and their descendants created phenomena apparent in the archaeological record, of which the Corded Ware Complex was the most prominent example. However, was it this simple? We were already wondering about this by 2020. The latest research has challenged the initial aDNA assumptions regarding the relationship between the Yamnaya and the Corded Ware complexes, as well as estimations of the actual amount of migration and violence involved. Furthermore, from an archaeological perspective, it is still unclear how the process of interaction and networking has unfolded in various regions of Europe.

Thus, the session aimed to shift the focus from genetics to archaeology, and analyse the material culture and ritual practices to explore how steppe transmissions occurred during the 3rd millennium BC. Since most of these phenomena are known especially through burial assemblages, our focal point was mortuary archaeology. Accordingly, we aimed to explore the similarities and differences seen within the mortuary remains of Yamnaya and previous, contemporary, and subsequent archaeological complexes of the 4th and 3rd millennia BC.

The volume presents the work of 25 researchers from Bulgaria, the Czech Republic, Finland, Germany, Ireland, Japan, Moldova, the Netherlands, Norway, Romania, Russia, Ukraine, and the United States, united in 11 articles. The themes discussed cover a wide region of the European continent, from the Lower Don steppes in the east to Northern Central Europe in the west, and a time span of approximately two millennia.

Approaches to the mortuary archaeology of the 4th and 3rd millennia BC societies show a diversity of methodologies. Some studies have analysed extensive regions, such as the article by Alexey Nikitin and Svetlana Ivanova, dedicated to long-distance exchanges along the Black Sea coast in the Eneolithic. Others provide an overview of latest research about the chronological phases and ritual characteristics of the Yamnaya Culture in well-defined geographic regions, such as the article of Valentin Dergachev focused on the steppe region between the Prut and the Dniester, or Horia Ciugudean's article in collaboration with colleagues, investigating the presence of Yamnaya communities in Transylvania and, particularly, their interactions with local societies. We also have to mention Sebastian Schultrich's contribution regarding the emergence of the Corded Ware Culture symbols and new ancestries in Northern Central Europe, facilitated by existing super-regional networks and identities during the Late Neolithic.

Other studies have focused on the transmission of specific components of burial practices or material culture items. Such is the study of Stefan Alexandrov on the possible origins of a particular group of crouched burials present in northeast Bulgaria between 3300 and 2900 BC. Here, we also have to mention the study of Masao Semmoto concerning the transmission of cord decoration on Early Bronze Age pottery in the Upper Thrace, as well as the article of Todor Valchev about new ways of presenting prestige through the display of weapons and ornaments such as daggers and hair rings. Similarly, the article of Jaroslav Peška advances the hypothesis of wooden four-wheeled ceremonial wagons, similar to those in the wider Black Sea region, being used for the burial of some individuals in the Moravian Corded Ware Culture.

Finally, some studies were dedicated to valorising the research potential of particular archaeological sites, such as the mounds from the Peschany IV burial ground in the Lower Don Eurasian steppes, presented by Natalia Shishlina and colleagues. Another example is that of the burial mounds excavated in Aliman, Romanian Dobroudja, presented by Cristian Eduard Ştefan and collaborators. Furthermore, Henk van der Velde and Niels Bouma have taken the case study of the Neolithic burial ground from Dalfsen, to investigate change or continuity in burial traditions between the Funnel Beaker period and the Corded Ware culture. We hope that the research covered in this volume will contribute to further fruitful discussions and open new perspectives on the micro-regional traits, regional particularities, and supra-regional complexities of steppe transmissions in the 4th and 3rd millennia BC.

At the end of this brief introduction, we express our gratitude to those who made the publication of this volume possible. We thank the authors for their contribution to this volume. We thank our colleagues Todor Valchev and Piotr Włodarczak for co-organising the EAA session at the Virtual Meeting in 2020 and for their support during the peer-review process. We thank the anonymous reviewers for their valuable feedback and insights that helped improve the articles. We would like to thank Stefan Alexandrov for kindly providing the illustration of the book's front cover. We would also like to thank Professor Volker Heyd from the University of Helsinki, who offered us the possibility to publish this volume in the *Yamnaya Impact on Prehistoric Europe Series,* and to Erzsébet Jerem, Rita Kovács, and Katalin Sebők from the Archaeolingua Foundation, Budapest, for their professionalism.

Bianca Preda-Bălănică & Marja Ahola
The Editors

Long-distance exchanges along the Black Sea coast in the Eneolithic and the steppe genetic ancestry problem

ALEXEY G. NIKITIN – SVETLANA IVANOVA

Abstract

The appearance of steppe genetic ancestry in the 3rd millennium BC in Europe coincided with the beginning of a new cultural and economic era dominated by pastoralist economy and progressively more centralized social institutions. These genetic and socio-cultural elements were brought to Europe by the descendants of the Eneolithic inhabitants of the Ponto-Caspian steppe. The details of the formation of the steppe genetic package and the identity of the contributors of its genetic components remain elusive. We propose that steppe genetic ancestry, as well as the cultural attributes that characterize the Early Bronze Age steppe pastoralists such as the Yamna(ya) (Pit Grave) culture complex, formed as the result of activities in connection with the circum-Pontic trade network. A millennium-long association among the Eneolithic cultures of the Ponto-Caspian steppe and forest-steppe, the eastern Balkan cultures of west Pontic, and populations of the Caucasus and northeast Anatolia, led to the integration of the elements of genetics, subsistence strategies, material culture, and worldview, to produce the foundation of a novel genetic and socio-cultural phenomenon by the last third of the 4th millennium BC.

***Key words**: Eneolithic, Ponto-Caspian steppe (PCS) genetic ancestry, Circum-Pontic trade network, Serednii Stih, Usatove, Yamna*

Introduction

In the 3rd millennium BC a major change in cultural, economic and genetic makeup took place in Europe. A genetic package associated with the nomadic cultures of the Ponto-Caspian steppe spread over most of continental Europe by the middle of the 3rd millennium BC. This genetic package is most commonly associated with a cultural conglomerate known as the Yamna (Yamnaya, Pit Grave) complex that formed during the last third of the 4th millennium BC in the steppes between the lower Volga and the lower Dniester. The Yamna genetic package consisted of ancestries of three distinct origins, not seen together in one population group until the Yamna. How and why the genetic and cultural package of the Yamna was formed is unclear. A considerable effort has gone into trying to solve this problem, yet a clear answer is still lacking. In the opinion of the authors, an extensive circum-Pontic trade network that formed since the early 5th millennium BC laid the genetic and cultural foundation for the emergence of the Yamna and the Indo-European cultural package in the Early Bronze Age (EBA).

Climate change and population transformations in Europe

Post-glacial Europe experienced three major genetic turnovers (Nielsen *et al.* 2017). First turnover took place around the end of the last Glacial, when humans who retreated to various regional glacial refugial zones at the height of the Last Glacial Maximum, spread out to re-populate Europe. The two subsequent genetic turnovers were associated with intercontinental migrations in the last 8000 years, which reshaped the cultural and subsistence practices in Europe. They also significantly shuffled the genetic ancestry of prehistoric Europeans. Both migration events were associated with major climate changes.

One of these climatic transformations took place about 6500 BC, when the Earth's atmosphere finally stabilized after the post Ice-Age fluctuations and the Atlantic Climatic Optimum had insured. Starting at about 6200 BC, a massive migration took place from central Anatolia, one of the world's major centers where agriculture evolved, to southern and, subsequently, central Europe. The onset of this migration coincided with a significant arid event ca. 6300–6000 BC in the circum-Pontic area (Kotova – Makhortykh 2010). The second migration wave of the out-of-Anatolia farmers reached the outskirts of Vienna in modern-day Austria by about 5750 BC (Nikitin *et al.* 2019). By the end of the 6th millennium BC, Anatolian genetic ancestry became dominant throughout Europe, replacing the autochthonous European hunter-gatherer (HG) ancestry to a large extent. As farming communities expanded in Europe, the range of European HGs became more and more restricted to the coastal areas of the Baltic and the Black Seas, not suitable for large-scale farming due to the climatic conditions that were either too cold or too dry (Malmström *et al.* 2009; Ivanova – Nikitin 2012).

European HG populations nevertheless thrived in the coastal areas, relying on fishing as the main subsistence mode. Such as, fisher communities living along the southern stretch of the Dnipro River in southeast Ukraine were able to flourish along the fish-rich Dnipro Rapids for millennia, without a significant change in their subsistence or cultural/ritual practices. These populations maintained a homogenous genetic pool, derived from HGs of eastern European Plain and adjacent areas (Eastern Hunter Gatherers, EHGs). In the Neolithic, the Dnipro Valley HGs received an influx of Western Hunter Gather (WHG) genetic ancestry (Mathieson *et al.* 2018) from the southwest of the Carpathians. Eastern HG ancestry also characterized the populations of the Volga-Ural area, in the steppes north of the Caspian Sea (Haak *et al.* 2015).

In the classic atmospheric chronology of the Holocene, the period between ca. 6500 and 3500 BC corresponds to the Atlantic chronozone (Anderson – Goudie – Parker 2007). This Atlantic climatic optimum is characterized by a generally warmer and wetter climate (Anderson – Goudie – Parker 2007), favorable for agricultural practices. Around 5000 BC, a warm period precipitating the lower Peron transgression, led to the rise in sea levels and a general warm-up of atmospheric temperatures. Around 4900–4500 BC, the coastal areas of southeast Europe such as the Danube Delta witnessed a significant increase in population density (Carozza *et al.* 2012), suggesting optimal conditions for producing economies of the populations of western and northwestern Pontic area. Evidence shows an increase in contacts between the eastern Balkans and the Ponto-Caspian steppe during 4500–4200 BC, coinciding with the intensification of the metal (cooper) mining and production in the coastal Balkan region.

The formation of Ponto-Caspian Steppe (PCS) ancestry

At some point during the 5th millennium BC, a different kind of genetic ancestry entered the north Pontic and north Caspian steppes. It was derived from the Mesolithic populations of central Caucasus (Caucasus Hunter-Gatherer, CHG) (Jones *et al.* 2015) and Meso-Neolithic populations of north-northwestern Iran (Lazaridis *et al.* 2016). The EHG-CHG genetic admixture was documented in the communities of the Khvalynsk cultural complex of the middle Volga region *(Fig. 1.29)* and the Serednii Stih complex (the Oleksandriia site, *Fig. 1.1*) of the lower Don/Donets basin from the last two thirds of the 5th – early 4th millennium BC (Mathieson *et al.* 2015; 2018; Wang *et al.* 2019). This merge between the EHG and

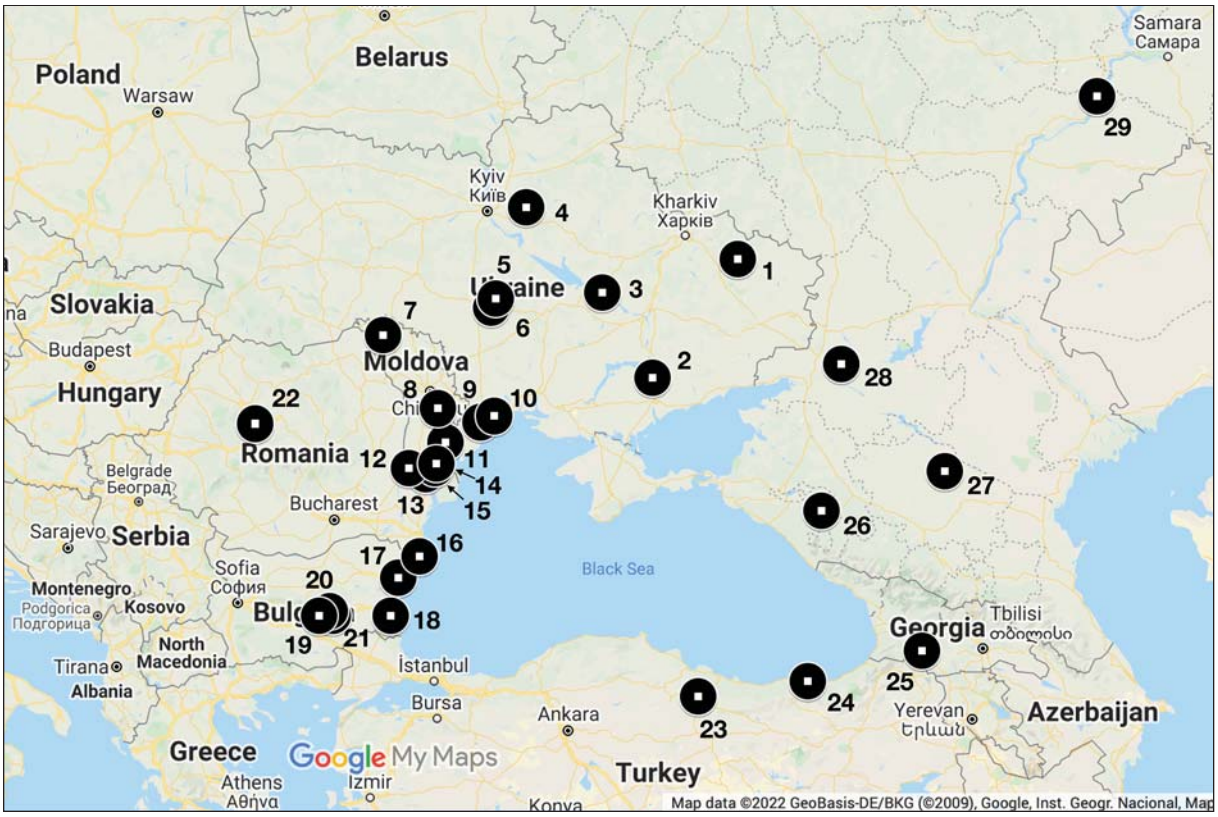

Fig. 1. Map of circum-Pontic sites mentioned in the text. The map is produced with Google Maps (maps.google.com). 1. Oleksandriia; 2. Mykhailivka; 3. Deriivka; 4. Sofiivka; 5. Maidanetske; 6. Nebelivka; 7. Chetroșica; 8. Căinari, Cărbuna; 9. Mayaky; 10. Usatove; 11. Sadove; 12. Giurgiulești; 13. Nova Nekrasivka; 14. Suvorove; 15. Utkonosivka; 16. Durankulak; 17. Varna; 18. Sozopol; 19. Ai-Bunar; 20. Karanovo; 21. Dyadovo; 22. Decea Mureșului; 23. Horoztepe; 24. Trabzon; 25. Kotias Klde; 26. Maykop; 27. Sharakhalsun; 28. Rakushechnyj Yar; 29. Khvalynsk

CHG ancestries became the foundation that would define the genetic core of the "steppe ancestry" that swept over Europe two millennia later.

Inhabitants of the Ponto-Caspian steppe maintained ties with agricultural communities to the west (the Balkans) and to the south (northern Caucasus) from as early as the 7th millennium BC. The influence of the Neolithic farming world on the communities of the Ponto-Caspian steppe region is evidenced through archaeology and archaeogenetics. Such as, remains of domesticated animals were identified in the early Neolithic layer at the Rakushechnyj Yar site in the lower Don (Dolbunova *et al.* 2020) *(Fig. 1.28)*. Comb-decorated pottery characteristic of the Impressed Ware culture appeared in the Lower Dnipro and northern Azov region in the early 6th millennium BC (Kotova – Demchenko – Kiosak 2021). Criş-influenced pottery at the Bug-Dniester culture sites in central Ukraine dates to around the same time (Kiosak *et al.* 2021). At the genetic level, an early Eneolithic individual dated to 4949–4799 cal BC carrying a west European mtDNA haplogroup H1 and aligning with the Bulgarian Chalcolithic at the whole genome level was identified at the Neolithic Deriivka I cemetery (*Fig. 1.3*) on the lower Dnipro River (burial 102) (Mathieson *et al.* 2018). Steppe-farmer interactions in the Eneolithic are evidenced by the presence of mitochondrial DNA (mtDNA) lineages of the H2a haplogroup of the Neolithic Anatolian origin (Omrak *et al.* 2016) at the Khvalynsk II cemetery (grave 4) in Russia as well as at the Oleksandriia cemetery (grave 5) and the Vynogradne kurgan 3 (burial 15) in Ukraine (Wilde *et al.* 2014; Mathieson *et al.* 2015; 2018). The latter two individuals date to the end of the 5th– beginning of the 4th millennium BC (Rassamakin 2009; Mathieson *et al.* 2018).

It seems probable that while not adopting agriculture as primary subsistence strategy, the Neo-Eneolithic inhabitants of the Ponto-Caspian steppe, such as those of the lower Don-middle Volga region, "borrowed" elements of farming economy, particularly domesticated animals (Kotova – Makhortykh 2010), from their farmer neighbors. A recent study determined that agro-pastoral practices at the Taman Peninsula, between the Black Sea and the Sea of Azov, started by 4995–4930 cal BC and likely have arrived to the Taman through the Caucasus-Caspian corridor (Kaniewski *et al.* 2016). Perhaps, this agro-pastoral introgression, likely through demic diffusion, brought elements of genetic ancestry from the Caucasus, such as CHG, resulting in the establishment of the "steppe" genetic mix (EHG+CHG) in the Ponto-Caspian area by the middle of the 5th millennium BC. By the end of the 4th millennium BC this steppe ancestry was passed to the people of the Yamna cultural complex. Steppe genetic ancestry will be referred to as Ponto-Caspian Steppe (PCS) ancestry throughout the paper from here on.

Eneolithic steppe pastoralists and the collapse of coastal Balkan communities

In the second half of the 5th millennium BC, steppe communities started to switch their subsistence to pastoralism. Pottery residue analysis from the Deriivka II site of the Serednii Stih II/Deriivka culture, dated to 4436–3988 BC (Lillie *et al.* 2009), shows evidence of the early stages of pastoralist economy, which included domesticated ruminant ungulates and, to a lesser degree, their secondary products such as milk (Mileto *et al.* 2017). These herders came to dominate the Eneolithic steppe, reaching the farming frontier settlements in the forest-steppe zone of western and central Ukraine and eastern Moldova. They also started to make contacts with the salt-mining centers of eastern Balkans. These west Pontic communities amassed considerable wealth by the end of the first third of the 5th millennium BC, primarily due to the production of salt on an industrial scale. The proceeds of the salt exchange led to an investment into a new commodity – metal. It was copper at first, followed by gold, and this time period became known as the Copper Age, or Chalcolithic. In the early 4th millennium BC, arsenic bronze technology was developed in Anatolia and subsequently spread across west Pontic via traders from Anatolia and the Balkans (Nikolova 2005). The extensive evidence of a long-range material goods exchange between the coastal communities of the west Pontic and the Eneolithic nomads of the Ponto-Caspian steppe has been thoroughly and extensively reviewed by D. Anthony (Anthony 2007; 2010; 2019).

At the same time, a sign of trouble can be seen throughout the communities of coastal Balkans in the second half of the 5th millennium BC. Radiocarbon dates from tell Karanovo indicate site abandonment by ca. 4400 cal BC (Nikolov – Petrova 2016). In the late 5th millennium BC, mean annual precipitation dropped to the lowest point in 4000 years, to just under 750 mm (Harper 2019). The only other time in the Black Sea coast prehistory between 6500 and 2500 cal BC the precipitation dropped to comparable lows was around 5700 cal BC (Harper 2019), which coincided with the appearance of first LBK settlements in central Europe (Nikitin *et al.* 2019). Such extreme aridization undoubtedly had an effect on human populations living along the west-northwest Pontic coast, and the farming economy overall. On the other hand, aridization led to the expansion of grazing lands for the Ponto-Caspian pastoralists to utilize. Aridization was also conducive to trade, particularly along the west-northwest shores of the Black Sea, where river crossings on the tributaries of the Danube started to dry up during predictable periods of the year, easing the travel across the northwestern Pontic region.

The aridization of the late 5th millennium BC was accompanied by a considerable climatic instability. This instability coincided with fluctuations in the Black Sea level. A significant cooling episode, corresponding to the Bond 4 cooling event in the North Atlantic (Bond *et al.* 1997), also known as the 5.9 Kya event, followed. David Anthony analyzed climatic and archaeological literature around the Bond 4 event and concluded that 4200–3800 BC were characterized by intermittent cold years and a general degradation of arid soils in the Lower Danube area (Anthony 2007). At the end of the 5th millennium BC, a Black Sea transgression, caused by the factors yet unknown, resulted in a rapid inundation of a large portion of the west Black Sea littoral (Peev *et al.* 2020). Pollen analysis of core samples from submerged settlements of Lake Varna and the Sozopol harbor (*Fig. 1.18*) indicate a cessation of agricultural activities at those sites by the end of the 5th millennium BC. The area remained submerged until the middle of the 4th millennium BC (Filipova-Marinova – Bozilova 2008). The collapse of the Varna-Karanovo VI-Gumelniţa (VKG) coastal west Pontic settlements during the last 300 years of the 5th millennium BC is likely directly connected with these atmospheric and hydrological events.

In all, farming activity in southeastern Europe experienced a marked decline by the end of the 5th millennium BC. This decline was accompanied by a rise of violence across the farming communities of Europe (Novak *et al.* 2021). With the reduction in the intensity of farming, population decline likely followed. Consequently, the demand on salt, the vital microelement of the farming communities, started to dwindle. The accompanying aridization might have further impeded the salt industry of the west Pontic that relied on salt springs, which might have dried up. Under these atmospheric circumstances, the lead in salt production shifted to the communities to the east (Usatove and, later, Yamna) that had access to salt that settles naturally *(Fig. 2)*.

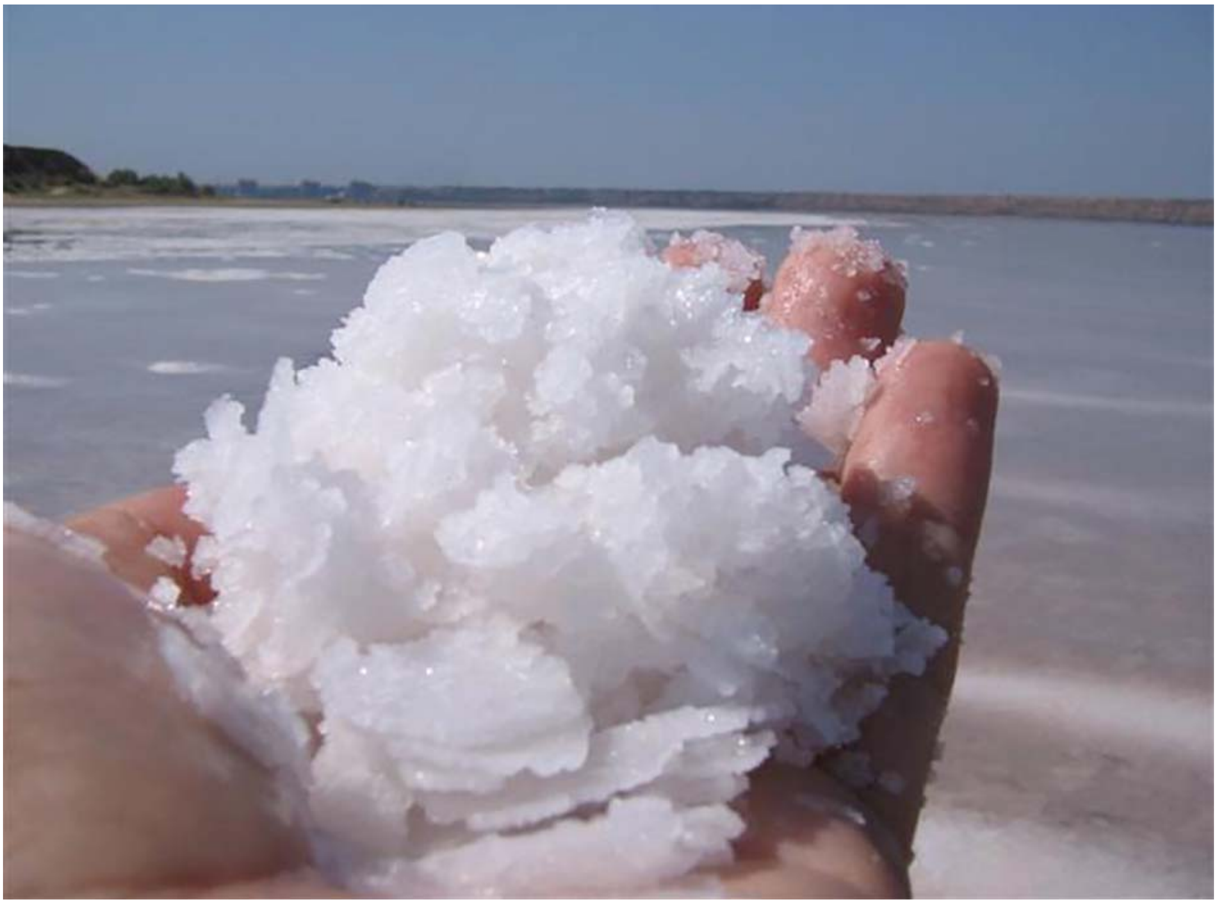

Fig. 2. Salt on the surface of the Kuyalnik Estuary (Liman) near the Usatove-Velykyj Kuyalnyk complex of the Usatove culture

Subsequently, salt-producing communities of Bulgaria began to lose their wealth and influence and eventually disappeared by the end of the 5th millennium BC. There are contrasting views on the events hastening the disappearance of these sites. Under one scenario, the tells of Chalcolithic east Balkan communities were ran down ca. 4400–4300 BC by the steppe horsemen in search of new grazing lands (Gimbutas 1977). However, archaeological evidence to support the violent end of the tells at the hands of the steppe invaders has been generally lacking (Govedarica 2004), not to mention the lack of evidence of horse domestication in the 5th millennium BC. Under a contrasting viewpoint, intercommunal conflict that sparked as a result of the drought following the climate change after 4200 BC and the disappearance of the salt mining springs (Nikolov 2016) was the decisive factor in the demise of these communities.

It has been argued that a shift from sedentary to mobile pastoralist herding lifestyle took place in the late 5th – early 4th millennium BC in the Balkans (Nikolova 2005). Apparently, various forms of economic specialization, possibly including autonomous pastoral communities, came to existence in different parts of the VKG complex at this time. A certain independence of pastoralism as a social and mythological subculture is found in the analysis of the linguistic foundations of the Balkan model of the world (Petrenko 2009).

Usatove and its place in the circum-Pontic trade network

At the end of the 5th – beginning of the 4th millennium BC, farming was still actively practiced in the forest-steppe region of eastern Europe between the Carpathian Mountains and the Dnipro River by the people of the Cucuteni-Trypillia culture complex. Trypillian farmers likely obtained salt from a salt-producing center, associated with the people of the Usatove culture *(Fig. 3)*, who settled around the brackish estuaries (limans) along the northwestern Black Sea shore in the Bugeac steppe (*Fig. 1.10*). The origins of Usatove may be connected with the VKG migration from the salt centers of east Bulgaria, following a surge in interpersonal violence and industrial decline of coastal Balkans. A dwelling in Nova Nekrasivka (*Fig. 1.13*) on the left bank of the lower Danube belonging to the Bolgrad-Aldeni II group, placed within the VKG complex and dated to 4350–4250 cal BC (Kotova 2013), was likely erected by the VKG refugees moving northeast. Nova Nekrasivka is located between Varna and Mayaky, an Usatove culture site (*Fig. 1.9*). A mid-5th millennium BC VKG site of Dyadovo, located near the eponymic Karanovo tell as well as the Thracian copper mining site of Ai-Bunar near Stara Zagora (*Fig. 1.19–21*), was reported to contain Usatove-like pottery (Nikolova 2005), further strengthening the association between VKG and Usatove. An individual from a burial excavated outside of the ritual ditch enclosure at Mayaky (Zbenovich 1974) and dated to the third quarter of the 5th millennium BC, was found to genetically overlap with modern Bulgarian population (Emma Svensson, personal communication, 2017), while carrying mitochondrial haplogroup U4 (Ivanova – Nikitin – Kiosak 2018). Haplogroup U4 is common among the Neo-Eneolithic inhabitants of the north Pontic steppe (Ivanova – Nikitin 2012; Nikitin – Newton – Potekhina 2012; Nikitin *et al.* 2017; Mathieson *et al.* 2018). Thus, genetic evidence suggests that VKG migrants from coastal Bulgaria were interacting with local inhabitants of the Bugeac steppe by the end of the 5th millennium BC to form Usatove genetic ancestry. Radiocarbon dates using AMS technology obtained on two burials from the Mayaky necropolis (Petrenko – Gerling – Kaiser 2018) and the finding of Trypillia A-BI ceramics at the same site (Petrenko 2009), corroborate the presence of an ancestral to Usatove population at the Mayaky site at the end of the 5th millennium BC.

Usatove occupied a strategic crossroads in the circum-Pontic trade network. In fact, Usatove's trade network might have extended into the Mediterranean zone. An Usatove kurgan near the village of Sadove on the western bank of the Dniester Estuary *(Fig. 1.11)* produced finds of beads of white faience,

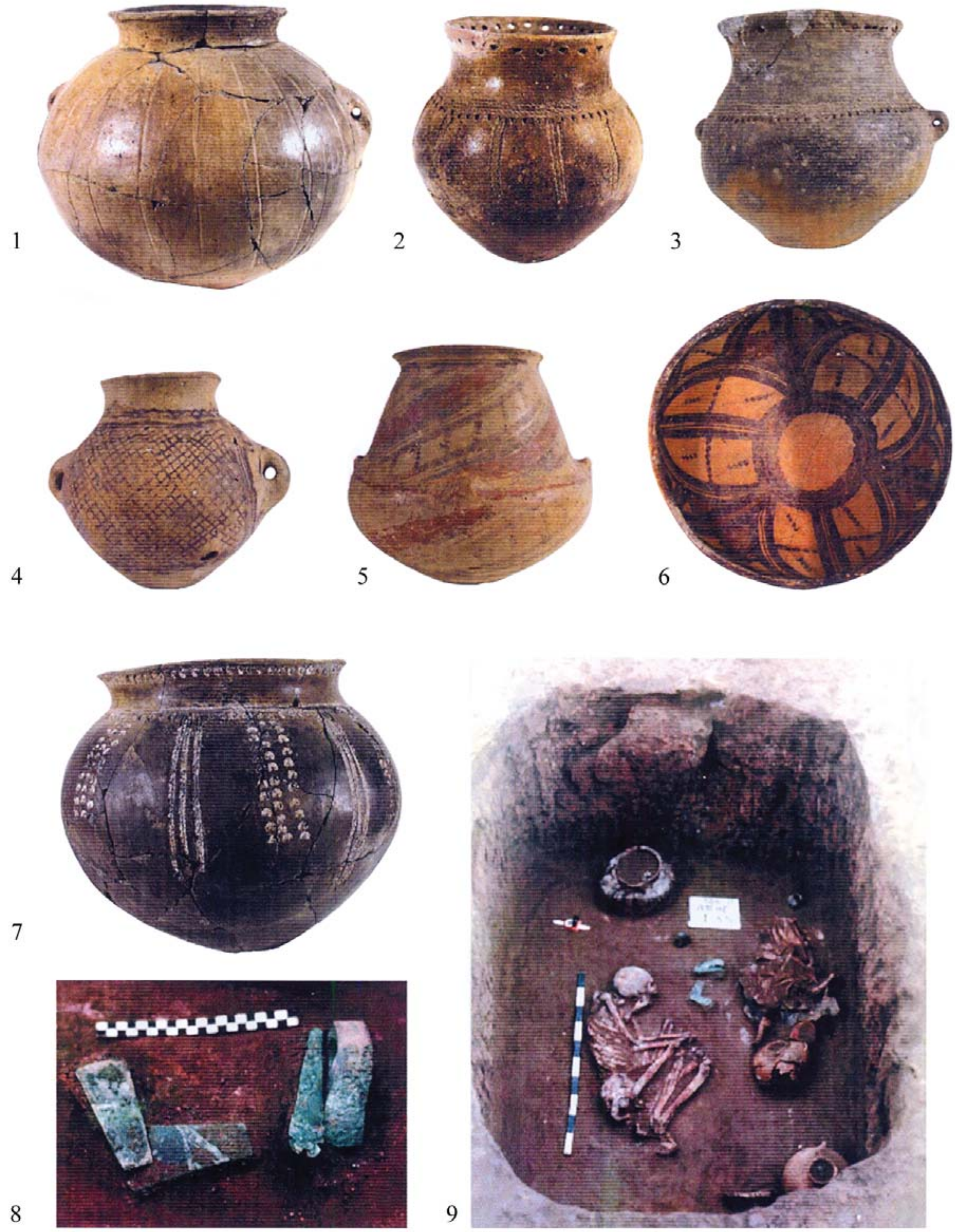

Fig. 3. Usatove culture artifacts. 1–3, 7. polished ceramics; 4–6. painted vessels; 8. copper and bronze artifacts (two flat axes/adzes, knife, chisel). Location of finds: 1, 2, 4–6. Mayaky; 3. Usatove; 7–9. main burial No. 35 of the Oleksandrivskyi kurgan (after Ivanova – Nikitin – Kiosak 2017, Fig. 40)

jet, Mediterranean horn corals (gorgonians) and a pendant-amulet from a typical Egyptian “alabaster” (Petrun’ 2000). Glass beads found in the second kurgan of the archaeological complex Usatove-Velykyj Kuyalnyk are among the oldest glass objects known in the Old World. Glass beads of comparable antiquity have been found at the Trypillian cemetery of Sofiivka near Kyiv (*Fig. 1.4*) (Klochko – Stolpiak 1995) and in a Trypillian treasure hoard near the village of Chetroșica in Moldova (*Fig. 1.7*), in the Middle Dniester region (Sergeyev 1969). The Usatove-Velykyj Kuyalnyk glass beads were likely made locally – as a product accompanying bronze metallurgy, indicated by the presence of arsenic in the glass (Klochko – Stolpiak 1995). Eneolithic glass from the Pontic area belongs, according to A. Ostroverkhov, to the circum-Pontic “proto-school” of glass making with roots in Anatolia and South Transcaucasia (Ostroverkhov 2002). High arsenic bronze technology existed in Anatolia since the early 4th millennium BC (Yener 2000). Fragments of some of the Usatove stone axes were made of mudstone-like rocks and porphyry-like microdiorite, the deposits of which are located beyond the Danube (Patokova *et al.* 1989). The liquation coating technology of covering the casting mold matrix with carbon, which gives the surface of large “Anatolian” daggers from the Usatove-Velykyj Kuyalnykk complex a silver-like shine, was used by Maykop metalsmiths and likely originated there (*Fig. 1.26*). Another coating technology, obtained by rubbing the finished bronze product with a paste containing a mixture of arsenic oxides, plant ash and charcoal followed by heating, was recorded on a dagger from the Usatove culture, found in kurgan 5 near the village of Utkonosivka (*Fig. 1.15*), as well as on some Maykop daggers and on ritual figurines of bronze bulls from Horoztepe in Anatolia (*Fig. 1.23*) (Ryndina 2002). High arsenic bronze finds from Usatove are technologically similar to the bronze from Ilipinar in northwest Anatolia (Nikolova 2005). Silver objects found at Usatove sites could have originated from the Aegean (Lavrion and Sifnos) or Maykop (Caucasus) mines (Jovanovič 1993; Petrenko 1997).

In all probability, Usatove was in direct contact with the Pontic steppe couriers of the Serednii Stih complex who brokered the exchange between the Volga-Caspian communities and the metal centers of Varna-Karanovo VI. On the other hand, Usatovans closely interacted with the Suvorove-Giurgiuleşti groups that established trade posts at river crossings along the trade routes in the lower stretches of major rivers of the northwestern Black Sea basin such as the Dniester and the Danube.

Eneolithic steppe nomads: traders or raiders?

The shell-tempered (Cucuteni type C) pottery characteristic of Khvalynsk-Serednii Stih began to appear on VKG/Kodjadermen sites towards the end of phase III/A-2, corresponding to Trypillia BI, ca. 4300–4100 cal BC (Georgieva 2018). Ceramic vessels of the Serednii Stih II/Deriivka type have been found on the Bolgrad-Aldeni II sites (Kotova 2013). The continuous occultation record at many of the VKG/Kodjadermen tells, despite intermittent layers indicative of burning/site destruction, argue for a peaceful (at least initially) coexistence between the local tell occupants and the incoming steppe traders (Georgieva 2018).

The analysis of copper from the Khvalynsk I and II necropoli as well as copper from Novonanylivka sites indicates that it is predominantly of the Balkan origin (Chernykh 1992; 2010; Georgieva 2018). The boar-tusk pendant found in burial 3 of the Giurgiulești necropolis bears similarity in shape and design to the gold pendant from the Varna necropolis (*Fig. 1.12*) (Georgieva 2018). It is noteworthy that copper from an early Trypillian Cărbuna hoard from Moldova (4700–4600 BC) was made from Bulgarian material that was likely recycled and traded throughout the steppe, including the Volga Valley (Radivojević – Roberts 2021 and references therein).

At the same time, whether the west Pontic copper and other material goods arrived in the steppe through trade or conquest, is difficult to ascertain. Both scenarios have support. The weaponized burial inventory of Suvorove (*Fig. 1.14*) and Novodanylivka, Suvorove's counterpart from the east Pontic, point to the militarized nature of their societies. At the same time, the weapons and status objects buried with them may have been intended to exert control over the trade routes. The trade route control vs. raiding scenarios, however, are not mutually exclusive. It is conceivable that Suvorove-Novodanylivka brought Balkan copper ingots (not ore, but billets, which are often found in Trypillian context) to Trypillian communities. There, metalsmiths riveted beads / hairpins, etc. patterned after Bulgarian craftsmen (or craftswomen) who fled to their Trypillian relatives after the demise of their settlements in the late 5th millennium BC. Perhaps the Trypillian megasites of the Nebelivka type are precisely connected with this migration. Under a scenario, preferred by one of the authors (AGN), the Nebelivka site (*Fig. 1.6*) (as well as other BII Trypillian megasites) served, in addition to other functions, as temporary shelters for migrants from the Balkans. Nebelivka existed for only 200 years, 3950–3750 cal BC, and had 1,445 buildings detected to date, which, apparently, were not occupied on a permanent basis (Albert *et al.* 2020). While the refugee function of Trypillian megasites remains tentative, a graphite-painted vessel, most likely imported from a Gumelnița group, was found at Nebelivka (Gaydarska – Nebbia – Chapman 2020). This find suggests a connection between terminal Gumelnița and the beginning of mega-construction at Nebelivka ca. 4000 cal BC. A gold spiral ornament found at Nebelivka could be traced to east Bulgaria as well (Gaydarska 2020), further strengthening the ties between Nebelivka and Gumelnița-Karanovo. The arrangement of the massive 345m^2 megastructure at the main entrance to another Trypillian megasite at Maidanetske (*Fig. 1.5*), suggests this building could have served, among other functions, as a welcoming center for refugees. Evidence of evenly distributed food consumption activities throughout the structure (Hofmann *et al.* 2019) corroborates this interpretation of the building's function. At the same time, the disbalance between the energy input to construct and maintain Nebelivka and other megasites and their use as temporary refugee camps does become apparent. We should point out, however, that no comprehensive explanation for the existence of Trypillian megasites has been put forward to date.

Recent studies of the "steppe graves" of the Suvorove type, located between the Danube and the Dniester indicate that these can be collectively dated to the second half of the 5th millennium BC, coinciding with the abandonment of the Balkan tells. A Suvorove-type site of Căinari produced a date of 4504–4339 cal BC (*Fig. 1.8*) (Govedarica 2004). Two dates from the ground necropolis of the Suvorove type at Decea Mureşului in Transylvania date it to the last third of the 5th millennium BC (*Fig. 1.22*) (Govedarica 2004; Rotea *et al.* 2014). The Eneolithic necropolis under kurgan 2 at the Suvorove site of Giurgiuleşti was dated to 4447–4069 cal BC (Govedarica – Manzura 2016). Yet, the overlapping chronology of the Suvorove-type graves and the abandonment of the Balkan tells do not necessarily indicate that the latter is the consequence of the violent activity of the former. Still, a connection between Suvorove and VKG undoubtedly existed. A Gumelniţa pot in one of the sacrificial pits at Giurgiuleşti (Petrenko 2009) is yet another piece of the already discussed evidence supporting this connection.

The establishment of PCS ancestry in the circum-Pontic trade network

We are beginning to get genetic data from the Eneolithic populations of the west-northwest Pontic area as well. Insufficient preservation of DNA coupled with handling and storage issues of the excavated material, as well as the accessibility of the material for genetic analysis, make the genetic ancestries of steppe populations difficult to ascertain. At the same time, significant progress in finding out the details of their ancestry is currently being made. Maternal genetic (mtDNA) lineages identified at the Suvorove-type site at Decea Mureşului belonged to the K haplogroup (Rotea *et al.* 2014), one of the major mtDNA haplogroups of Anatolian Neolithic farmers and their European agrarian descendants (Nikitin 2019). Preliminary results of the genetic analysis of the interred at Giurgiuleşti, obtained in the lab of David Reich at Harvard (D. Reich, personal communication, 2021), indicate that the uniparental genetic lineages from a child in burial 3 match those of a Mesolithic hunter-gatherer (Jones *et al.* 2015) from the Kotias Klde rock shelter site in the Republic of Georgia (*Fig. 1.25*). The Kotias site lies approximately 100 km away from the eastern Black Sea shore in southwest Caucasus. The Kotias genetic ancestry is characterized by the CHG component, which also characterizes PCS ancestry along with the EHG genetic component. Published evidence indicates the presence of varying amounts of PCS ancestry in the Balkans (Smyadovo, Tell Yunatsite, Varna) ca. 4700–4400 BC (Mathieson *et al.* 2018). On the other side of the Ponto-Caspian steppe range, PCS ancestry was present in the Samara region at Khvalynsk, in a chronologically earliest, to date, burial 12, dated to 4934–4780 cal BC (Wang *et al.* 2019). After incorporating the offset produced by freshwater reservoir effect (FRE), the upper range for the appearance of the PCS ancestry at Khvalynsk should be considered to be about 4700 BC (D. Anthony, personal communication, 2019), or coeval with its appearance on the western shores of the Black Sea. We can thus conclude that PCS ancestry may have already been present throughout the circum-Pontic trade network by about 4700 BC and that it became established among the participants of that network by the end of the 5th millennium BC.

The routes and transports of the circum-Pontic trade network

The routes of the Circum-Pontic trade network can be traced through burials and settlements with non-local features, as well as artifacts that may have resulted from direct or multi-stage exchange. The Kotias site is about 400 km northeast from Trabzon in northeastern Anatolia by land and ca. 300 km by sea. Artifacts found at the Giurgiuleşti necropolis bear resemblance with the items from the "Trabzon hoard" which (*Fig. 1.24*), in turn, are remarkably similar to the finds from the Eneolithic necropoli at Varna and Durankulak (*Fig. 1.16–17*) (Ivanova 2012). All these sites might have been connected by the Eneolithic intercontinental trade network that involved the entire Black Sea shore and extending to the north Caspian shore, from where trade goods would have been delivered following the Volga River to Khvalynsk. While it is possible to carry the activities associated with this trade following overland routes, it might have been more efficient to travel by sea.

The Varna estuary can be considered the starting point of the Eneolithic maritime trade. From Varna, trade goods such as copper would have been transported to the Danube delta by boats sailing along the coast. From there, trade commodities would have been carried inland following the Prut, Siret, Bug, and Dniester rivers (Todorova – Vaisov 1993). It is possible that the Eneolithic cultures of the Balkan-Danube region extended the sea trade routes along the northern Pontic shore and via the waterways of the Kuma-Manych depression to the Volga and upriver to Khvalynsk (Popov – Dimov 2019).

If the Eneolithic circum-Pontic trade was carried out overland, the question about the transport used for this activity needs to be addressed. While metal ingots and finished metal products can be carried by individual couriers, metal ore and salt would require means of transportation capable of moving heavy payloads. Wheeled wagons ideally fit such transportation need. Clay models of disc wheels begin to appear on Trypillian settlements in the middle 4th millennium BC (Korvyn-Pyotrovskyy – Movsha 1999). Some scholars connect the distribution of Trypillian imports in the steppe during the second half of the 4th millennium BC with the activity of the Zhivotilovka-Volchansk steppe groups (Rassamakin 1996; 1999). Burials from the eastern Azov steppe (Koldyri kurgan 14 burial 7 and Novokorsunskaya kurgan 2 burial 18), which are attributed by some scholars to Zhivotilovka-Volchansk (Rassamakin 1996), or to Novosvobodnaya-Maykop, by others (Kondrashov – Rezepkin 1988; Izbitser 1993; 2017), had wooden wheels in the graves. Both burials are dated to before the last third of the 4th millennium BC (Izbitser 2017). The famous sitting in a wagon Sharakhalsun 2 burial 18, dated to 3336–3105 cal BC (Wang *et al.* 2019), is located in the Manych steppe, ~500 km to the east (*Fig. 1.27*). An investigation into the genetic connection between the Manych and Zhivotilovka-Volchansk wagon drivers is currently taking place at the lab of D. Reich at Harvard.

It has been suggested that the origin of the Novosvobodnaya cultural group is associated with the influence or direct migration of the Funnel Beaker culture (FBC) groups from Central Europe (Rezepkin 1989; 1991). A FBC pot from Bronocice, Poland, dated to 3637–3373 cal BC (Milisauskas – Kruk – Hudson 2019), carries one of the earliest known depictions of a wheeled wagon in Europe. Whether the Koldyri and Novokorsunskaya wheels (and, we should assume, wagons) and the Sharakhalsun 2/18 wagon are related to, or, perhaps, descend from, the FBC wagons of central Europe, remains an open question. Meanwhile, archaeological evidence strongly supports the presence of wheeled transport in the Ponto-Caspian steppe by 3500–3300 BC, facilitating long-range mobility in the steppe during the second half of the 4th millennium BC.

The Eneolithic steppe corridor and the origin of Yamna

Despite the apparent diversity of culture types, Eneolithic steppe populations of the Ponto-Caspian region were, to a large extent, interconnected through genetics, ritual attributes, and economy. The main players on the Eneolithic steppe scene were the Serednii Stih and Khvalynsk complexes. Serednii Stih formed in the Don-Kalmius interfluve near simultaneously with the Khvalynsk forming in the Volga region, in the late 6th – early 5th millennium BC (not FRE-adjusted). The similarity in material culture and burial customs led some scholars to propose the existence of the Khvalynsk-Serednii Stih cultural-historical complex (Kotova 2008). Serednii Stih bordered Khvalynsk along the Don-Volga boundary through the first two thirds of the 5th millennium BC (Kotova 2008). In the last third of the 5th millennium BC, a distinct Deriivka culture formed within the Serednii Stih horizon (Kotova 2013). The culture was named after a pastoralist settlement of Deriivka II that appeared next door to the fishers of Deriivka I (Telegin 1986).

Deriivka I continued local Neolithic traditions well into the 4th millennium BC. Genetically, however, they started to harbor PCS admixture since the middle of 4th millennium BC (Mathieson *et al.* 2018), likely brought by the Serednii Stih II/Deriivka pastoralists. Steppe genetic ancestry was present in Khvalynsk since the first third of the 5th millennium BC (Wang *et al.* 2019). It is just a matter of time before the early Serednii Stih is shown to harbor PCS ancestry as well.

Integration between the different steppe groups of the 4th millennium BC led to shared cultural attributes. The common cultural package was forged by the reciprocal absorbing of the influences of the neighboring groups, as well as the traditions of the more distant communities they interacted with. Such as, from the Mariupol-type extended supine burial position of the Dnipro Valley fishers and the crouched on the side position of the farming groups of Anatolia, Europe and the Caucasus, a “rider” position with the body on the back and the legs bent at the knees, eventually evolved. This burial position became dominant in the Yamna horizon. The kurgan-building ritual favored by the Yamna may have come from the contact zone between Trypillians and FBC communities (Nikitin *et al.* 2017). Archaeological and genetic evidence suggests the influence of Serednii Stih pottery styles on Trypillian ceramics and the presence of Serednii Stih on Trypillian sites in central Ukraine from the beginning of the 4th millennium BC (Nikitin *et al.* 2023). Thus, the Anatolian/Levantine farmer genetic component that defines the Yamna ancestry along with EHG and CHG (Wang *et al.* 2019) could have come from Trypillia-FBC as well.

Interactions with the Caucasus during the Eneolithic undoubtedly influenced the ethno-cultural landscape of the North Pontic steppe as well, potentially contributing to the establishment of the Yamna phenomenon. Radiocarbon dates from Lower Mykhailivka, a Serednii Stih II/Deriivka culture group, overlap with the dates from Maykop culture sites (Kotova 2013). Maykop pottery was found in the Lower Mykhailivka archaeological context (Korobkova – Shaposhnikova 2005). The relationship between the Pontic steppe communities and north Caucasus may, in fact, predate Maykop. This is evidenced by the finds of the Serednii Stih I/Skelya ceramics in the pre-Maykop phase of the Svobodnoe settlement (Petrenko 2009). Trade/exchange links between the Caucasus and western Pontic were maintained in the 4th millennium BC by the Maykop-Novosvobodnaya – Cernavodă – Usatove interactions (Anthony 2007), with Lower Mykhailivka a likely intermediary. The Caucasus influence during the Maykop period extended throughout the Pontic region and reached as far west as northwest Moldova (Dergachev 2019). These interactions likely influenced the cultural transformation leading up to Yamna, although it is unclear to what extent this influence had extended.

The archaeological sequence of the multi-layer Mykhailivka settlement (*Fig. 1.2*) from the Eneolithic Lower Mykhailivka to Yamna (Korobkova – Shaposhnikova 2005), strongly suggests the participation of Lower Mykhailivka in the formation of Yamna. Ceramic assemblage of Lower Mykhailivka links it with Trypillia (Korobkova – Shaposhnikova 2005), the genetic ancestry of which is predominantly of Anatolian farming origin (Mathieson *et al.* 2018). On the other hand, the influx of farming genetic ancestry in the Eneolithic steppe could have resulted from interactions between Deriivka II and Gumelniţa, which, according to N. Kotova, participated in the formation of the Lower Mykhailivka group (Kotova 2013). It is also possible that the contacts between Lower Mykhailivka and the north Caucasus led to the influx of farming genetic ancestry, associated with the Anatolian/Levantine farmers of the Neolithic, into the steppe gene pool. At the same time, genetic evidence published to date argues against the Anatolian farmer genetic component in the Yamna to be derived from the Caucasus (Wang *et al.* 2019).

Considering the existence of early Yamna burials at Usatove sites (Petrenko – Gerling – Kaiser 2018), Usatove may have participated in the formation of the Yamna ancestry as well. Thus, Anatolian farming ancestry detected in Yamna may have come from Usatove, which received this ancestry from VKG. Eneolithic farming groups stemming from VKG are the likely genetic founders of Trypillia (Nikitin 2020). Taken together, VKG-Trypillia emerges as the primary candidate for the source of the Anatolian farming genetic ancestry in the Yamna.

Conclusion

We propose that a circum-Pontic trade network was established by the end of the first third of the 5th millennium BC, linking the salt and metal-producing centers of west Pontic with the Eneolithic nomadic groups of the Ponto-Caspian steppe. This network extended from the western shores of the Black Sea throughout the steppe and the adjacent forest-steppe area from the Carpathian foothills in the west to the middle Volga/Samara region in the east. This network also involved coastal communities along the eastern-southeastern Black Sea and the adjacent inland areas. Trade goods, along with genes and novel technological advances, were exchanged along this trade area, giving rise to long-range mobility. Cultural innovations and their subsequent exchanges among the steppe groups bound by shared ancestry contributed to the formation of common ideology throughout the steppe portion of the network, thus setting the stage for a large-scale transformation to the Yamna worldview. The proximate factors that precipitated the switch to the Yamna tradition remain elusive.

These trade exchanges also promoted the establishment of the PCS ancestry during the second half of the 5th millennium BC, through interactions between the steppe inhabitants and their partners in the trade of copper and other material goods. This genetic ancestry, combining EHG, CHG and, to varying extent, Neolithic Anatolian/Levantine farmer components, became the genetic signature of the Yamna people in the EBA and which spread throughout Europe by the middle of the 3rd millennium BC. It is also conceivable that the Indo-European language group was formed within this circum-Pontic trade network, and involved linguistic elements of the participant groups and cultures of Anatolia, eastern Balkans, the Ponto-Caspian steppe and adjacent forest steppe, and the Caucasus.

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Yamnaya group from the Peschany IV burial ground in the Lower Don Eurasian steppes: local or non-local?

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OLGA KUZNETSOVA – VYACHESLAV SEVASTYANOV

Abstract

This paper discusses the Yamnaya burials from the Peschany IV burial ground located in the Remontnoye district, Rostov region, Russia. According to the radiocarbon dating, approximately in 2900–2700 cal BC a Yamnaya group inhabited the steppe valley of the Dzhurak-Sal River. They built several kurgans in which humans of both sexes and all ages were buried. Specific features of their funerary rite include wooden constructions, plant mats and pillows stuffed with plants. The carbon and nitrogen isotopic composition of bone collagen of an old man, a woman, and children retrieved from the burials demonstrates low variation. In our view, this local Yamnaya group developed a special subsistence system and exploited a rather small area.

Key words: *Sal-Manych Ridge, Yamnaya culture, subsistence system, radiocarbon dating*

Introduction

The Bronze Age of Eurasian Steppe lasted roughly from 3500 to 1500 cal BC. One of the main cultures of the Early Bronze Age is the Yamnaya culture, the chronological interval of it falling within 3200/3100–2600 cal BC (Shishlina 2008).

Archaeological studies of the Yamnaya culture have found that, despite common features, the rites used by different regional Yamnaya groups demonstrate some distinctive traditions with different funerary assemblages, and special features in arranging burial mounds within a sacred landscape. Besides, the analysis of the burials from some burial grounds provides an opportunity to discuss resources that could have been used and were actually used by certain local groups to meet their material and cultural needs. Various natural resources (soil, pasture, wood, stones, etc.) exploited in the southern part of the Russian Plain were reflected in the human material culture (sets of artefacts made of bone, clay, metal, stone, plant and animal fibre, and other natural materials). The resources people needed for their everyday life activities as well as their funerary rites could be obtained locally or, if not available in the area where people lived, were, probably, brought from other regions. Variations in the carbon and nitrogen isotopic composition of bone collagen from humans, wild and domestic animals enable us to define the main components of their subsistence system and thus delineate the exploited areas.

In this paper, we introduce the analyses of the Yamnaya graves from the Peschany IV burial ground located in the Remontnoye district, Rostov Region (kurgans 11, 13, 16 and 21), craniological and isotopic analyses of Yamnaya humans. We believe that the analyses of Yamnaya graves left by local group of population could provide important information about the local subsistence system. The carbon (δ^{13}C) and nitrogen (δ^{15}N) isotopic composition of bone collagen from animals retrieved from the Yamnaya graves and the Temrta seasonal site located in the Sal-Manych Ridge area are used as baselines. The comparative analysis of δ^{15}N and δ^{13}C values for the Yamnaya humans from Peschany IV and other kurgans located in the Sal-Manych Ridge (Peschany V, Temrta IV, and Ulan IV) provided an opportunity to discuss possible localization of food resources used by the studied local group. We also obtained AMS ^{14}C measurements of the human and animal bones as well as wood from Peschany IV graves and determined the time of its use.

Environmental context

Peschany IV is located in the Remontnoye district, Rostov region, 6 km southeast of the village of Remontnoye on a small watershed plateau between the Dzhurak-Sal river and a temporary stream valley known as the Peschanaya *balka* (*Fig. 1*). The steppe valley of the Dzhurak-Sal river (which is a tributary of the Sal river) is wide and is cut by *balkas* (*Fig. 2*). A *balka* is a steppe small river valley with well-defined Holocene terraces 5–7 m high, which is dry most time of the year. The flow of most *balka* rivers is made up of melt waters; therefore, *balkas* have full-flowing streams only in spring. Some *balkas*, though, are fed by groundwater and have an all-year flow, running dry only in the driest summers. The steppe *balkas* extend from the west to the east and can be quite vast with a flood-plain as wide as 1 km. The main type of vegetation in *balkas* is gramineous plants-wormwood associations.

Paleosol characteristics of the Yamnaya kurgans demonstrate that light chestnut soils with various degrees of alkalinity were widespread throughout the Yamnaya period, the precipitation rate in the region was 370–390 mm/year (Alekseeva *et al.* 2007; Kalinin – Alekseev – Lessy 2009). Identification of the plant remains preserved in this areas indicate to the predominance of graminouse plants and wormwood associations during the Yamnaya period (Shishlina 2008).

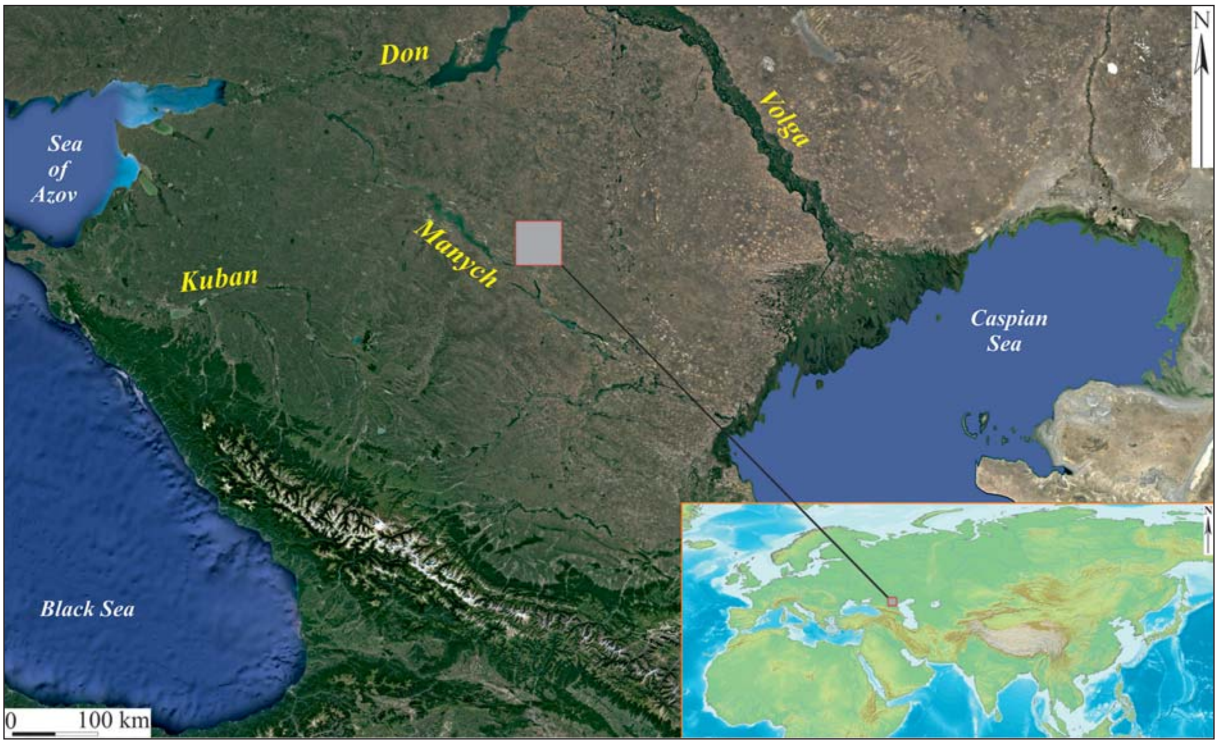

Fig. 1. Sal-Manych Ridge – the area of the research

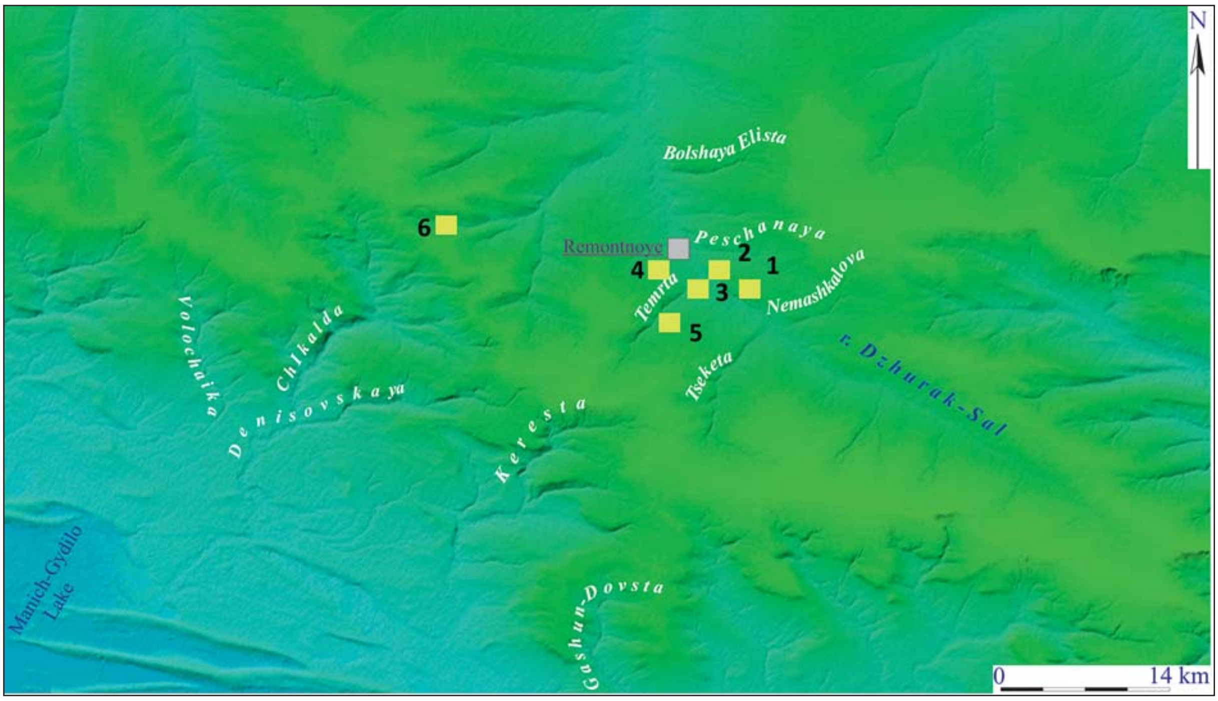

Fig. 2. Sal-Manych balka system. Locations of the sites: 1. Peschany IV, 2. Peschany V, 3. Temrta I, 4. Temrta IV, 5. Temrta seasonal camp site, 6. Ulan IV

The main subsistence activity of the Yamnaya population was pastoralism. It was a distinctive economic model with the use of new principles of rotation of pastures, landscape use and individual mobility (Shishlina 2008).

Local funerary rites

The reconstructed Yamnaya funerary rites of Peschany IV are presented below.

Kurgan mounds. All primary graves are located in the centre of the kurgans, secondary burials were added into different parts of the mound. The average diameter of the primary kurgans is approximately 14.0–20.0 m and their height is 0.5–1.0 m. Most kurgans were round-shaped.

Kurgan 11. There is a small oval ditch running around the northern side of the kurgan. Primary Yamnaya grave 4 was located in the centre. Secondary Yamnaya grave 6 overlies the primary grave and is parallel to primary grave 4.

Kurgan 13. Primary Yamnaya grave 6 was located in the centre. Secondary Yamnaya grave 5 overlies the primary grave.

Kurgans 16 and 21. Small oval kurgans 0.5–0.8 m high with a diameter of 8.0–10.0 m were constructed over the primary Yamnaya graves.

The Yamnaya mounds were used in the subsequent periods: secondary Catacomb and Sarmatian burials were added into different parts of the mounds.

Burial constructions. The predominant burial construction of all Yamnaya graves is a rectangular pit (*Fig. 3.2*). Grave 4, kurgan 16 was constructed in a rectangular pit with ledges in the walls (*Fig. 3.1*).

The pit was roofed with wood beams; there were plant mats and pillows stuffed with steppe plants placed inside the pit.

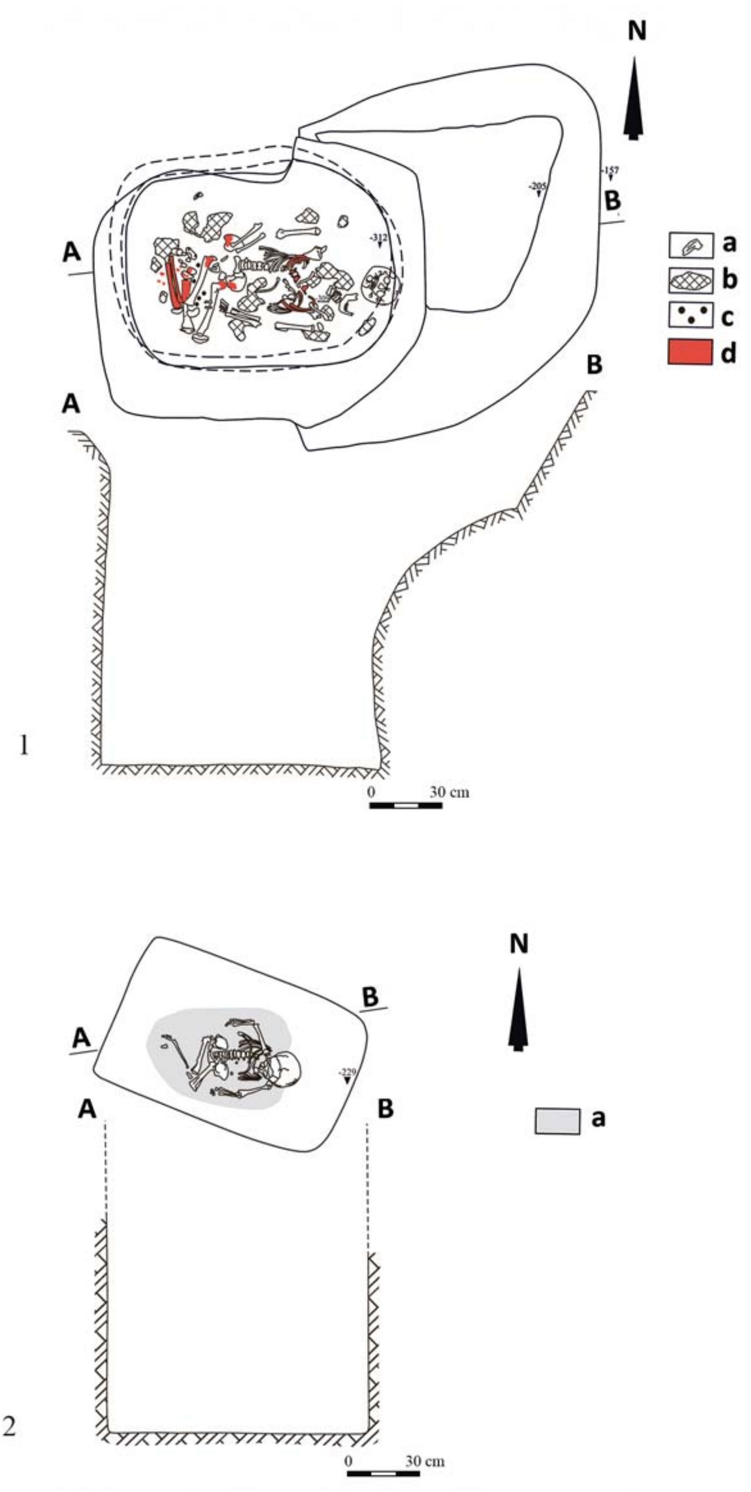

Fig. 3. Peschany-IV kurgan burial ground. 1. kurgan 16, burial 4, plan (a. wood fragments, b. mat, c. charcoal, d. red pigment), 2. kurgan 21, burial 3, plan (a. mat)

Fragments of oval wooden blocks rectangular in section and wedge-shaped blocks with a transverse kerf were found in the fill of rectangular grave 4, kurgan 11, in the centre of the pit (*Fig. 4.1*); vertically

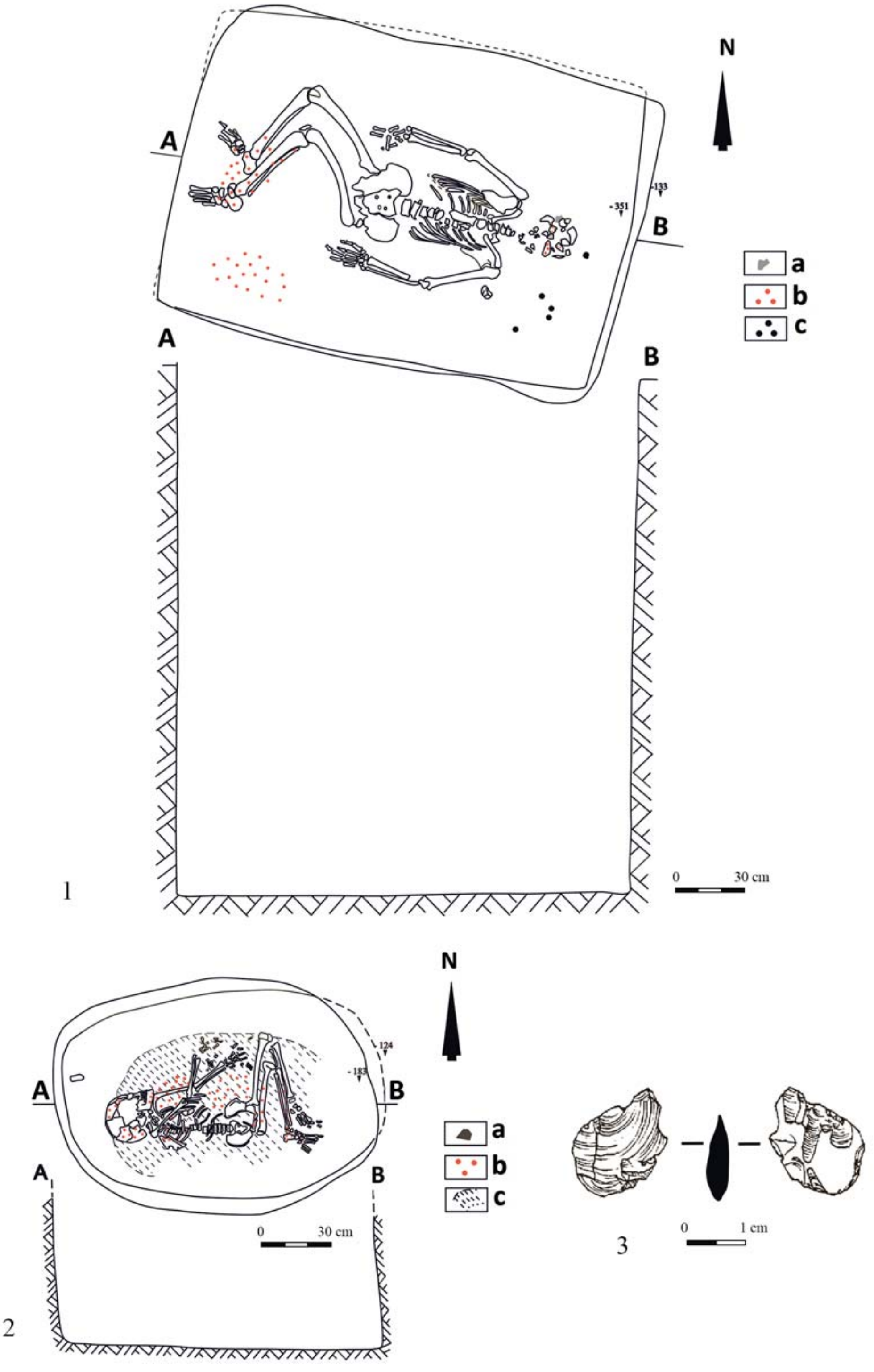

Fig. 4. Peschany IV kurgan burial ground. 1. kurgan 11 burial 4, plan (a. sheep astragals, b. red pigment, c. mat); kurgan 11, burial 6: 2. plan, 3. flint flake

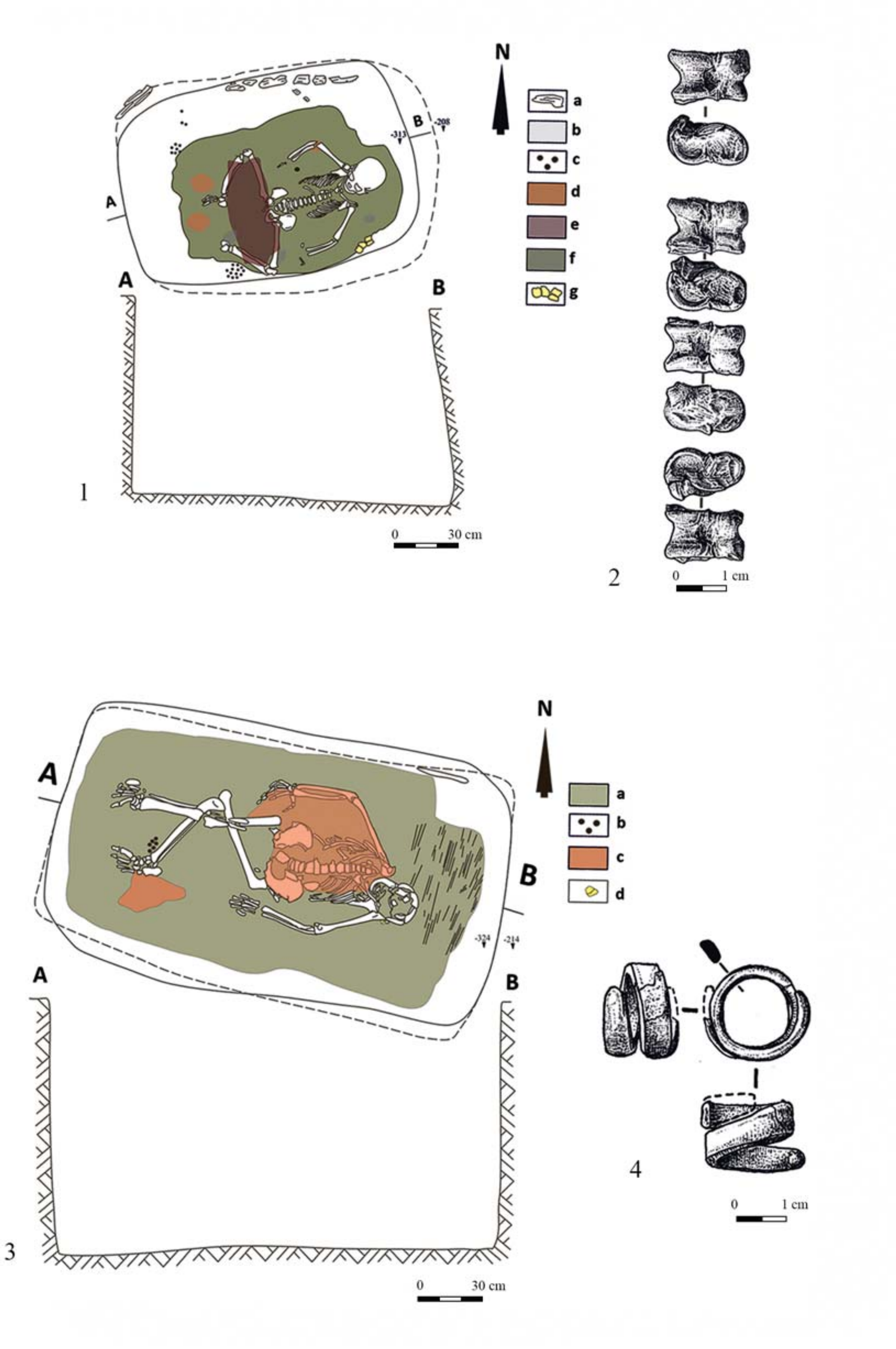

Fig. 5. Peschany IV kurgan burial ground. 1. kurgan 13, burial 6, plan (a. wood fragments, b. mat, c. charcoal, d. red pigment, e. plant 'coverlet', f. organic, g. sheep astragals), 2. sheep astragals; kurgan 13, burial 5: 3. plan (a. mat, b. charcoal, c. red pigment, d. bone hair ring), 4. temporal bone pendant

standing blocks were found near the walls in the bottom. This means that either the pit had a roof of a rather sophisticated design made up of wood, or a wooden framework was erected over the skeleton. The fill of grave 6, kurgan 13 (*Fig. 5.1*) revealed small wood fragments; two long wood fragments were preserved in the northwestern corner and along the northeastern wall. It might mean that a wooden construction was made over the grave. It was, probably, supported by round wooden poles, decayed remains of which were preserved seven centimeters south of the left shoulder and near the calcaneal bone of the left foot. A plant 'coverlet' covering the leg bones survived on the skeleton: twigs or fibres were located perpendicular to the backbone. It is quite possible that this coverlet was supported by wooden poles, but subsequently it fell on the skeleton. The rectangular pit of secondary grave 5, kurgan 13 (*Fig. 5.3*), was roofed with beams some fragments of which were retrieved from the grave fill and the northeastern corner. Imprints of the twigs were identified on the north wall near the bottom, a wood fragment was found in the fill. It is possible that the ledged pit of grave 4, kurgan 16, was also roofed with wooden beams or blocks.

Grave 6, kurgan 11, had a plant mat of 90×60 cm lying on the bottom (*Fig. 4.2*); the size of quadrangular mats found in grave 6, kurgan 13, and grave 4, kurgan 16, is 102×74 cm and 54×85 cm, respectively.

The pillows were rather large and when the stuff that filled them disintegrated, the skulls of the dead rolled to the side (grave 6 and grave 5, kurgan 13; grave 4, kurgan 16).

Therefore, practically all Yamnaya graves at Peschany IV were roofed with sophisticated wooden structures, or maybe, a framework supported by vertical poles was erected over the deceased person; the walls were probably reinforced with plaited twigs whereas the bottom was covered with plant mats and pillows. Phytolith identification of plant remains indicates that these plant mats were made from stem and leaves of reed and non-identified plants.

The position of the dead. A typical posture of the deceased is a supine posture with extended arms with raised legs and the head facing the east or southeast. It was only burial 6 in kurgan 11 where a child's body was oriented to the west.

Funerary offerings include sheep astragals (*Fig. 5.2*) and a flint chip (*Fig. 4.3*). An original bone temple ring turned into 1.5 coils (*Fig. 5.4*) was found in the woman's grave in kurgan 13, burial 5.

The use of red pigment to sprinkle the legs, the head and the upper part of the body is typical for almost all burials.

Anthropological analyses

The number of skeletons from Peschany IV burial ground is not representative yet. The analysed samples include one male, one female and five children (*Table 1*).

Table 1. Peschany IV burial ground. Age and sex of individuals

context	**age at death (years)**	**sex**
kurgan 11, grave 4, primary	45-55	male
kurgan 11, grave 5, secondary	9-11	-
kurgan 13, grave 6, primary	6-7	-
kurgan 13, grave 5, secondary	45/55>55	female
kurgan 16, grave 4, primary	~7	-
kurgan 16, grave 4, primary	under 1 year	-
kurgan 21, grave 4, primary	2 (±8 months)	-

However, it should be noted that the number of children in the Peschany IV Yamnaya group is not typical for anthropological series of the Yamnaya culture (Gromov – Khokhlov 2018); moreover, the children were of different age: a baby under 1 year, a child aged 1–3 years, two children aged 5–9 years and a child aged 9–12 years. Both the adult male and the female were 45–55 years old or above 55.

The number of skulls from Peschany IV and the state of their preservation still do not allow us to specify their cranio-facial characteristics. Nevertheless, excavations of the Bronze Age kurgans at the village of Remontnoye in the Sal-Manych Ridge have been carried out for more than fifteen years, and large-scale investigation of the kurgan grounds in the northwestern Caspian steppes region has been under way for many decades. The first publications of cranio-facial data showed that the series of the Yamnaya locals were unique compared with other skull series from the North Black Sea steppes and the Volga region (Shevchenko 1974). This conclusion was later confirmed, as new human remnants were collected, and wider intergroup comparative analyses were conducted (Alekseev 1983; Shevchenko 1986; Khokhlov 2006; 2017; Gerasimova 2011; Kazarnitsky 2014).

It appears that in the Early Bronze Age there existed a distinctive Yamnaya group in the northwestern Caspian steppes region including the Sal-Manych Ridge. It is characterised by a wide brain case, wide frontal and orbital breadth combined with prominent nasal bones, a high nose bridge and facial profile, which is not sharply pronounced in the upper part. This morphological feature may be a result of a long-term residence of the studied human group in one place, if the group was large enough to maintain its reproduction; another determinant of this specific morphological feature is, most likely, relative isolation of this group from inhabitants in the neighbouring regions, though the funerary rites of the Sal-Manych Yamnaya group and the Yamnaya groups settled in other regions share some common features (Khokhlov 2006).

Local Yamnaya paleodiet

The collagen extraction from the human bones was done at the ^{14}C laboratory of the Institute for the History of Material Culture (IIMK) of the Russian Academy of Sciences. Stable isotope ratio measurements of collagen and plant remains were made at the Vernadsky Institute of Geochemistry and Analytical Chemistry (GEOKHI) of the Russian Academy of Sciences using a DELTA Plus XP isotope mass-spectrometer (ThermoFinnigan) linked to a Flash EA 1112 elemental analyzer. The isotope ratios are reported in permil notation relative to VPDB and AIR for δ^{13}C and δ^{15}N, respectively. Each sample was measured in triplicate and the standard deviation of repeated measurements was 0.2‰ and 0.2 to 0.3‰ for δ^{13}C and δ^{15}N, respectively. Collagen integrity was assessed by the atomic C/N ratio (Schoeniger – DeNiro 1984).

δ^{15}N and δ^{13}C data of bone collagen from the individuals buried in the Yamnaya kurgans at Peschany IV are provided in *Table 2* along with the data on the animals from the Yamnaya graves and the Temrta seasonal site. *Table 2* also includes isotope data for the plant mats from Yamnaya kurgan 17, Peschany IV. The previously published data on the isotopic composition of bone collagen from kulan and saiga (wild animals from the steppes) retrieved from the Catacomb sites in the studied region and plants from the Yamnaya graves are used for comparison as a local isotopic baseline (Shishlina – Sevastyanov – Kuznetsova 2018; Shishlina *et al.* 2020).

Table 2. δ^{15}N and δ^{13}C data for the Yamnaya humans, and plants and animals from Sal-Manych Ridge

Sample	**δ^{13}C, ‰ VPDB**	**δ^{15}N, ‰ AIR**	**C:N**
Peschany IV			
kurgan 11, grave 4, male 45-50	–15.3±0.3	16.6±0.3	3.2±0.2
kurgan 13, grave 5, female 45-55	–16.2±0.25	17.7±0.25	3.2±0.1
kurgan 13, grave 6, child 6-7	–16.5±0.25	16.6±0.3	3.2±0.1
kurgan 16, grave 4, child 7	–16.4±0.3	16.6±0.2	3.2±0.2
kurgan 11, grave 4, sheep bone	–17.5±0.35	11.4±0.3	3.2±0.15
kurgan 17, grave 5, plant mat (stem and leaves of read)	–18.8±0.4	5.1±0.2	4.4±0.2
kurgan 17, grave 5, plant mat	–12.2±0.3	6.5±0.3	4.5±0.25
Temrta seasonal site			
sample 77, large ungulate	–20.0±0.25	7.4±0.3	3.0±0.1
sample 74, kulan	–20.4±0.3	6.3±0.25	3.2±0.1
sample 79, horse	–22.7±0.35	6.2±0.3	3.0±0.15
sample 73, cattle	–19.2±0.25	9.4±0.3	3.1±0.1
Peschany-V			
kurgan 15, barrow mound 2, sheep	–20.6±0.35	15.8±0.3	3.2±0.1
Temrta-I			
kurgan 1, grave 9, sheep	–17.5±0.2	10.7±0.25	3.3±0.1

Figure 6.1 clearly shows that the analysed individuals of all ages from Peschany IV have a specific isotopic composition of bone collagen characterised by elevated δ^{13}C and δ^{15}N values. It may be explained by a number of factors, such as climate aspects typical for this regional landscape zone (mixed plant pastures in the Peschanaya *balka* and soil salinity), a specific subsistence system of the studied local Yamnaya group and fodder of their domestic animals. This hypothesis is confirmed by variations in the nitrogen and carbon isotope composition of two plant mats from the Yamnaya grave in kurgan 17 of the same burial ground (one mat is made up of the arid C_4 plants) and as well as variations of the isotopic composition of bone collagen from domestic animals. Some animals fed on pastures where C_3 plants prevailed, while others, for instance, sheep from kurgan 11 at Peschany IV, kurgan 15 at Peschany V, and kurgan 1 at Temrta I, fed on either mixed C_3-C_4 vegetation pastures or arid C_4 pastures (*Table 2*). The pasture area of wild ungulates (kulan, saiga) overlapped with the steppe niches where the local Yamnaya pastures were located.

Radiocarbon dating

Various carbon-rich materials, such as human and sheep bones, and wood were selected for AMS-dating of the Yamnaya graves at Peschany IV. All samples were dated at the University of Groningen Centre for Isotope Research, the Netherlands.

Radiocarbon data obtained and the weighted average date for Peschany IV Yamnaya kurgans were calibrated using the calibration curve (IntCal20) (Reimer *et al.* 2020) (*Table 3*).

The results show that the radiocarbon age of all human bones is practically the same; human and sheep bones from burial 4, kurgan 11; the human bone and wood from burial 6, kurgan 13, also demonstrate the same radiocarbon age.

The mean radiocarbon date is 4176±13; the calibrated observation is 2880–2676 cal BC (sigma 2).

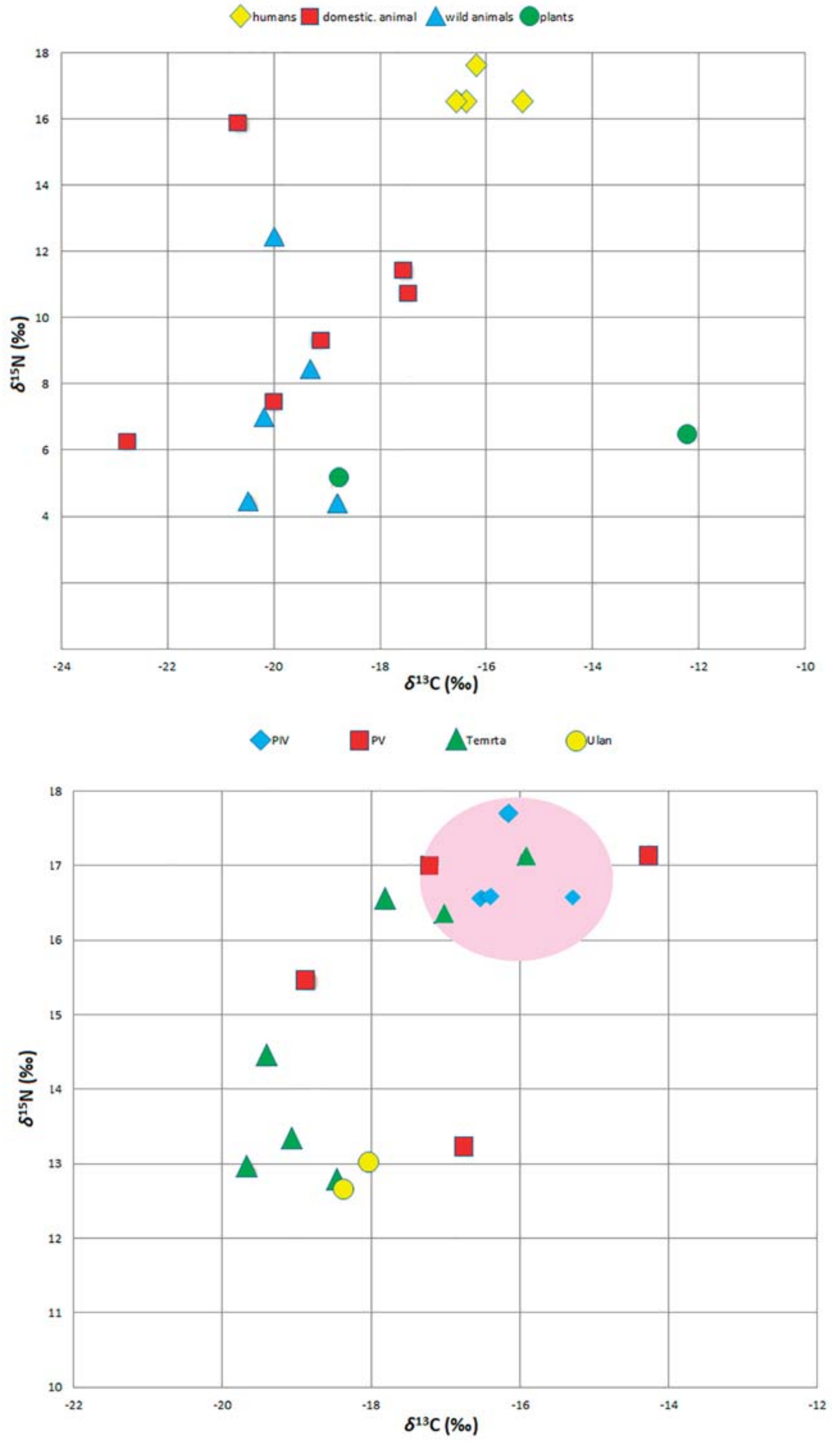

Fig. 6. Yamnaya culture of the Salsk-Manych Ridge. 1. $\delta^{15}N$ and $\delta^{13}C$ isotopic composition of human and animal bone collagen and plant remains from Peschany IV, 2. $\delta^{15}N$ and $\delta^{13}C$ isotopic composition of humans from Peschany IV, Peschany V, Temrta IV and Ulan IV. Pink oval indicates the isotope values of humans from Peschany IV

Table 3. Radiocarbon dating of samples from Peschany IV (Shishlina et al. 2021)

No.	**Lab №**	**sample/ age**	**kurgan/ grave**	**^{14}C (BP)**	**Calibrated ^{14}C (BC), 2σ**	**δ^{13}C, ‰ VPDB**	**δ^{15}N, ‰ AIR**
1	GrA67588	Human bone male 45-50	k. 11, g. 4	4180±35	2887–2632	–15.3	16.6
2	GrA67587	Sheep bone	k. 11, g. 4	4175±35	2886–2631	–17.5	11.4
3	GrA64621	Human bone child	k. 13, g. 5	4200±35	2899–2637	–16.2	17.7
4	GrA64624	wood	k. 13, g. 6	4145±35	2878–2585	–26.1	–
5	GrA64622	Human bone male	k. 13, g. 6	4130±35	2871–2579	–16.5	16.4
6	GrM16406	Human bone	k.16, g.4	4210±25	2899–2677	–16.4	16.6
Mean radiocarbon date				4176±13	2880–2676		

Discussion and conclusion

Our analysis clearly demonstrates that, most likely, a small local Yamnaya group, which included men, women and children lived in the Dzhurak-Sal river valley around 2900–2700 cal BC. This group buried its relatives using a funerary rite typical for other Yamnaya groups that inhabited the northwestern Caspian steppes, the Sal-Manych Ridge and the Lower Don region.

The only artefact that stands out from the rest of the funerary offerings is a bone spiral hair ring turned into 1.5 coils, it is a forehead accessory that belonged to the elderly woman from the studied sample. There are no analogies to this item. Bronze hair rings with open ends are a common find in the Yamnaya graves of the East Manych and the South Yergueni Hills (Shishlina 2008, Fig. 45. *1, 5, 6*). Large bronze spiral hair rings turned into 1.5 coils appeared in the subsequent period in the steppe northern Caucasus burials (Shishlina 2008, Fig. 64. *14*) as well as the East Manych and West Manych Catacomb burials (Sinitsyn 1978).

The mapping of other Yamnaya burials located between the Sal and the Manych rivers, a recently discovered Yamnaya seasonal site in the Temrta *balka* as well as the available ^{14}C dates of the Yamnaya culture (Shishlina 2008; van der Plicht *et al.* 2016) show that early in 3000 cal BC the vast steppe areas of the Sal-Manych Ridge were quite densely populated. We think that their inhabitants exploited all resources of the steppe areas.

However, the isotopic markers of the subsistence system developed by the small Peschany IV Yamnaya group have shown some specific features of this local group's diet components.

The analysed isotopic composition of bone collagen from the individuals of the Peschany IV Yamnaya group and other contemporary Yamnaya groups inhabiting both the neighbouring areas (Peschany V) and other *balkas* (the Yamnaya Temrta I and Temrta IV kurgan burial grounds are located in the Temrta *balka* lying 8–10 km away from Peschany IV; Ulan-IV is located between the Denisovka *balka* and the Gorkaya Bugulta *balka* lying 30 km from Peschany IV) demonstrates large variations in the isotope values of the four Yamnaya groups: Peschany IV, Peschany V, Temrta I/Temrta IV and Ulan IV, which buried their relatives in the kurgans located either closely or quite far from each other. As is clearly shown in *Figures 6, 2* and *7*, the subsistence system of the local Yamnaya group that left behind Peschany IV is quite different from that of other Yamnaya populations that occupied other steppe *balkas* included in the analyses as reflected in their diet preferences. For example, the diet system of some Yamnaya individuals buried at Peschany V, Temrta IV included several typologically similar food components with high values of δ^{15}N and δ^{13}C. On the whole, the Yamnaya groups from Peschany V and Temrta IV are characterised by large variations in the nitrogen and carbon isotopic composition (*Fig. 7*). Elevated δ^{15}N values can inform about high share of animal products in human diet, especially fish, or other steppe components such mushrooms (Shishlina – Sevastyanov – Kuznetsova 2021). Individuals from Peschany IV exhibit such high δ^{15}N ratios. However, as their radiocarbon ages were not affected

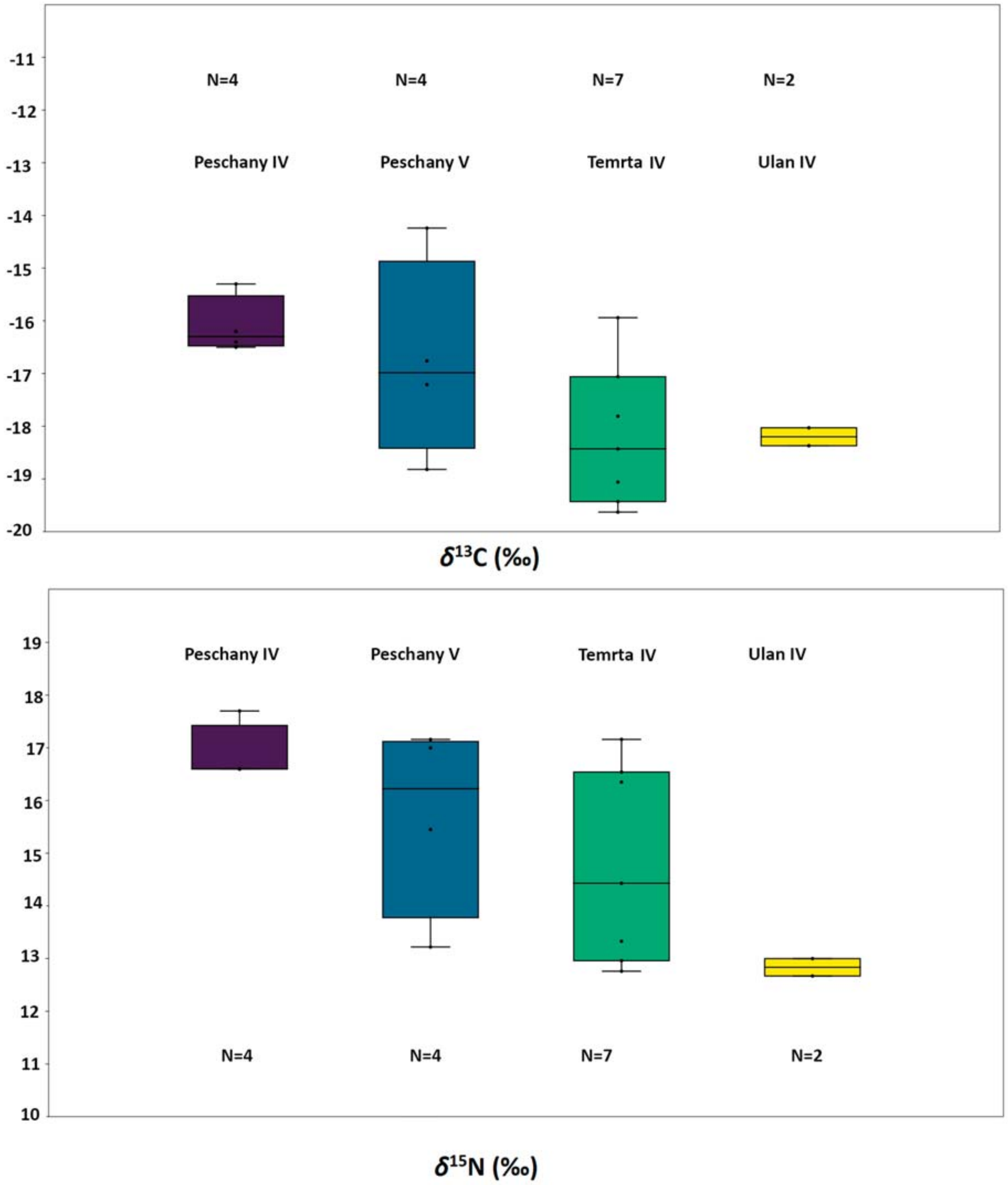

Fig. 7. Boxplots of δ^{13}C and δ^{15}N values of Yamnaya individuals from Peschany IV, Peschany V, Temrta IV and Ulan IV

by freshwater reservoir effect (van der Plicht *et al.* 2016) it can be concluded that their diet did not include significant amounts of aquatic foodstuffs.

The individuals from Peschany V located near Peschany IV also have elevated δ^{15}N. However, the comparison of the radiocarbon age of these individuals and that of the terrestrial samples from the same grave show a clear offset up to 850 yr (van der Plicht *et al.* 2016) which means that the diet system of other Yamnaya groups, even those who lived nearby, could include freshwater components as well.

The lowest δ^{15}N and δ^{13}C values have been recorded for the Yamnaya group from Ulan IV (*Fig. 7*).

The earlier studies of the subsistence system developed by the Caspian steppes population in the Bronze Age led to the conclusion that the Yamnaya groups in this region had a multi-component diet. The stable isotope study of the human bones from the Caspian steppes found that a river fish component accounted for a large share in the diet system of the Yamnaya population in this vast region (Shishlina 2008; Shishlina *et al*. 2014). The new isotope data on the local Yamnaya individuals from Peschany IV located in the Sal-Manych steppes, which is a region located southwest of the Caspian steppes demonstrate that the local Yamnaya group had other preferences in its diet system. Based on the stable isotope data, the Yamnaya population groups inhabiting the Sal-Manych Ridge can be divided into several groups: those who consumed fish (Peschany V, Temrta IV), those who did not (Peschany IV) and those who preferred a mixed variant (Ulan IV).

The low variation and similar isotope values of bone collagen from the Peschany IV individuals (the elderly man and the woman, and the children aged 6–7 years) imply that the local Yamnaya group exploited quite a limited resource area. Strontium isotope (^{87}Sr/^{86}Sr) variations in the enamel of the two adult individuals buried at Peschany IV, and their comparative analysis with the local baseline samples (Shishlina 2023) confirm that at least some of the individuals were born in the area of the Peschanaya *balka* or nearby. It seems possible that the potential resource base exploited by this group was not large, and we consider all individuals buried in four kurgans of Peschany IV to be locals.

Acknowledgements

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Budzhak "Culture" through the prism of the cartographic method

VALENTIN DERGACHEV

Abstract

Despite a huge number of specialists, there is no clear idea of the nomenclature status of the Yamnaya culture of the Carpathian-Dniester region, and, accordingly, understanding of their real place in the terminological structure. The analysis of some categories of grave goods (e.g. vessels of the Budzhak type, spiral temple rings, tubules, etc.) revealed their relationship with the funerary rite, as well as the specifics of distribution in the Carpathian-Dniester region. Since the groups of burials identified based on the funerary rite (having chronological significance), manifest themselves as relatively stable combinations of qualitative and quantitative indicators, they are a reflection of two main periods of the Yamnaya culture of the Carpathian-Dniester region. The burials of the Carpathian-Dniester region are an integral part of a complex cultural phenomenon like the Yamnaya (cultural and historical) community. Therefore, in terms of nomenclature, for the burials of the Carpathian-Dniester region, it would be more correct to formalise the status of a regional unit, with the term like Carpathian-Dniester regional variant of Yamnaya culture, by analogy with the Balkan, Tisza, Southern-Bug and others. Within the Carpathian-Dniester regional variant, two periods are clearly distinguished: early (Dniester) and late one (Budzhak).

Key words: *Carpathian-Dniester region, Bronze age, Yamnaya culture, periodisation, mapping*

Over the last decades, Eastern European and Western scholars re-emphasised the issues of Yamnaya culture between the Carpathians and the Dniester. The interest is caused by: 1) the location of this region that served as a contact zone between different cultural traditions associated with populations of Eastern, Southeastern and Central Europe; 2) increasing Yamnaya culture data from this area and neighbouring regions; 3) rapid and intensive accumulation of new data obtained from natural sciences (^{14}C, aDNA, etc.). These trends are reflected by generalisation on the Yamnaya culture in the Carpathian-Dniester region (e.g., Subbotin 2000; 2003; Ivanova 2001; 2001–2002; 2013a) and even more numerous studies of cultural-historic and interpretation character (e.g., Ivanova 2012; 2013b; 2013c; 2016; Ivanova – Toschev 2015; Klochko *et al.* 2015; Kleyn 2007; 2016; 2017; Kaiser 2019). "And God realised that this is good" (Genesis 1: 31).

However, despite such a significant number of studies, experts still lack a clear understanding of the taxonomical status of the Yamnaya culture sites in the Carpathian-Dniester region and, therefore, lack a clear understanding of their meaning in terms of structural relations. In other words, by avoiding the understanding of sites through the data systematisation, numerous authors start dealing with general interpretations misinforming their colleagues (who are not familiar enough with the data) and provoking endless discussions.

Let me briefly explain this issue. By the end of 1960s – the beginning of 1970s, N.Ya. Merpert systematised the available data and identified spatial borders of Yamnaya sites. Integrated into the Yamnaya cultural complex, these sites are subdivided into nine relatively spatially distinct (local) variations. Sites between the Carpathians and the Dniester were claimed to mark the southwestern variation of the cultural complex (Merpert 1968, 14–15, 38–39; 1974, 12–14).

Twenty years later, after intensive field research and data accumulation, the first monograph, which was specifically focused on the understanding of the funeral rites of Yamnaya culture in the analysed region, was published (Yarovoy 1985). Due to the analysis of available records and application of statistical methods, Yarovoy identified two relatively distinct horizons or periods within this dataset. The first horizon is mainly characterised by skeletons laid supine with legs raised at the knees (Group I). The second horizon is mainly characterised by skeletons laid on the back, with a more or less accentuated inclination on the right or left side (Group II) and, partly, strongly crouched on their left or right side (Group III) (Yarovoy 1985, 44–49, 109).

A year after E.V. Yarovoy's book, my monograph dealing with the general characteristics of the Moldavian Bronze Age cultures was published. One of its parts was focused on the analysis and systematisation of Yamnaya culture burials (Dergachev 1986, 26–87). The dataset of a similar size (nearly 1200–1300 barrow burials) and the application of a different methodology brought up somewhat unexpected conclusions. The analysis identified the internal periodisation of the Yamnaya culture recorded in funeral rites and several categories of artefacts, which are characterised by stable correlations. The latter methodologically suggests objectively defined structural units. This makes possible the following conclusion.

The Yamnaya culture between the Carpathians and the Dniester includes two relatively distinct spatial and chronological variations or horizons.

The first, defined as the "Dniester" variation, represents the early development of this culture. It spread across the overall region and partly included the Lower Danube area. Its diagnostic characteristics are the supine position with the legs raised at the knees (usually they fall to the left or right side, or both sides, shaping a "rhombic" position), poor inventory: spiral-shaped rings made of silver or copper, vessels of spherical forms having two handles, anthropomorphic stone stelae and parts of wooden wagons.

The second, "Budzhak" variation represents the late period of this culture. Unlike the first variation, the second mainly spread in the steppe part of Dniester and Prut interfluve. Its diagnostic characteristics are a position of the individuals on the back, with a more or less accentuated inclination on the right or left side (with a stable position of hands) and, partly, a significantly crouched position of bodies correlated with relatively rich inventory: vessels of different types, bracelets composed of copper plates rolled to a tube, wedge-shaped axes and bone arrowheads (Dergachev 1986, 74–87).

The results of the presented analyses regarding the chronological differentiation of burials attracted the interest of experts, especially young researchers dealing with barrows by its advantage to work with diagnostic criteria for the data analysis from numerous Yamnaya graves. Both studies influenced the introduction of the terms "ancient-Yamnaya" and "Yamnaya" burials (defining the body position in the grave) into scientific circulation in the 1980s–1990s. The terms were used to define chronologically different complexes. Both terms are currently still being used.

The division of the Yamnaya culture into two distinct chronological variations, Dniester and Budzhak, which are different not only in terms of the position of bodies, but also by materials of different categories, had a different history. This suggestion was discussed, cited, but remained weakly understood and not being used. Later on, this idea obtained a ritual sense, being just cited as an opinion in the history of research.

Knowledge on the Yamnaya culture between the Carpathians and the Dniester was influenced over the last 20 years by the work on this topic of S.V. Ivanova, which resulted in the publication of a significant number of papers.

According to Ivanova, Yamnaya sites in the Northwestern Black Sea area represent a distinct unit, the Budzhak culture ("in frames of Yamnaya cultural complex"), which is typical for the overall Carpathian – Dniester region (Ivanova 2013a, 216). It should be noted that alternative, often very different interpretations (Ivanova 2014) were also suggested by the same scholar (seeming to represent a certain uncertainty of such hypotheses) as it was pointed out by L. S. Kleyn (2016, 6).

S. V. Ivanova claims that the "Budzhak culture", of an evolution history reaching 900 years (3100/3000–2000/2100 BC), represents a relatively monotonous cultural unit, whose populations practiced the same funeral rites (characterised by the mentioned triad – supine position with legs raised at the knees, the position of the individuals on the back, with an inclination on the right or left side). Due to the long duration and external interactions, this culture includes a specific complex of data, to a higher or smaller degree typical for its overall span.

Discussing the state of the art, S. V. Ivanova notes that the "issues of internal chronology of Budzhak culture are weakly developed by the moment" (Ivanova 2013a, 220). However, disregarding the unsound nature of the idea of a monotonous and continuous development of this culture for almost a millennium (characterised by significant cultural transformations including the replacement of many cultures and cultural complexes by each other), she assumes three possible stages in its development. Unfortunately, as in many other cases, this distinction seems to be based on the insubstantial use of the same diagnostic characteristics and parameters mainly representing funeral rites. Therefore, the meaning of these three stages remains fuzzy (Ivanova 2013a, 219–223).

A more recent study of S. V. Ivanova states the division of this culture into two stages, *the Early (3100-2600/2500* BC*)* and *the Late (2600/2500-2200* BC*)* (Ivanova 2020, 182). This statement represents nothing but a declaration because the division is not explained.

Now let us turn from the history of research to the important issues of Yamnaya sites in the analysed region. These are the internal chronology and periodisation of the Yamnaya culture and the taxonomic position of sites. The issues are approached through the analysis of artefacts belonging to three categories (representing ceramics and ornaments), which are considered in the context of the spatial distribution of sites.

Concerning the analysis of the spatial distribution of sites, it is important to emphasise the following. Mapping sites is one of the key methods of archaeological research. Every dissertation or book mentions its application. However, mapping sites very often results in one or two figures reflecting sites of some culture or category of finds. Applications of this methodology to more sophisticated tasks focused on the identification of the internal structural components of complicated units, such as the Yamnaya culture as a cultural complex or scaled to the Carpathian-Dniester region, are not known to me. Thus, let us demonstrate the advantages of the method.

First, let us consider vessels of the Budzhak type. This term is used since the early publications of this specific ceramic type (Shmaglij – Chernyakov 1970). Considering the general rarity of ceramics in Yamnaya complexes, this form belongs to quantitatively dominating types. Over 90 archaeologically complete vessels of Budzhak type are known from c. 3000 complexes.

This type of vessel is very specific because it is not known from earlier or later cultures in this region or synchronous cultures of neighbouring areas. This is the reason for marking these vessels to be "labels" of the Budzhak culture by S. V. Ivanova and other scholars. However, to what extent does this "label" label the culture?

Figure 1 represents the variability of all known vessels referred to Budzhak type. This figure illustrates cup-shaped or jar-shaped vessels, mainly conical or nearly cylindrical shape (*Fig. 1.7, 23*) with a more or less rounded body. With the only exception (*Fig. 1.10*), all of them have a flat bottom, while nearly half of vessels also have ring pallets (*Fig. 1.1–5, 7–8, 12–13, 19–21, 26*). Handles (distinct

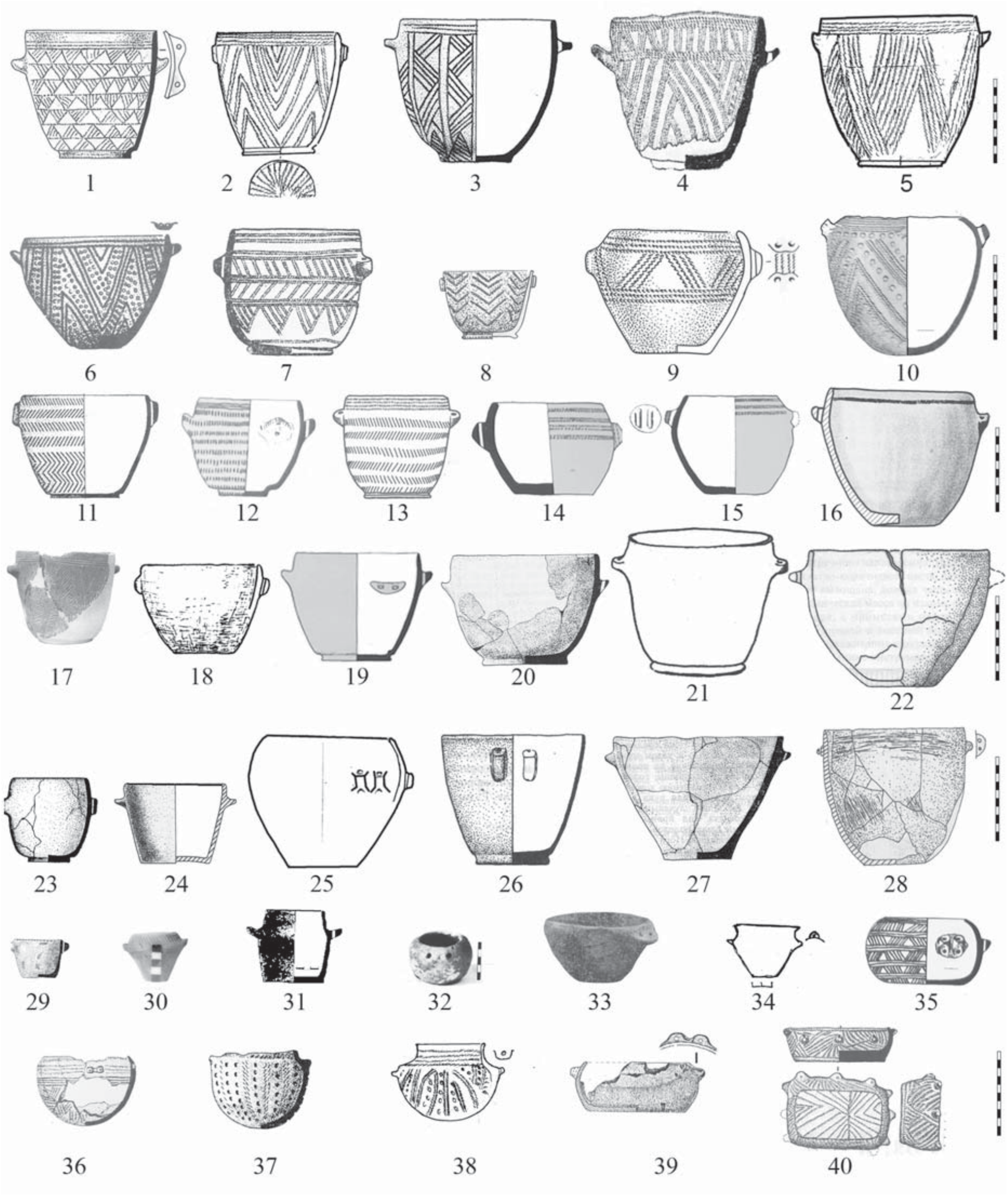

Fig. 1. Budzhak type vessels (1–16. ornamented; 17–30. non-ornamented; 31–40. derivatives). 1. Dubăsari 4/4, 2. Chervonyy Yar I, 1/2, 3. Diviziya II, 6/3, 4. Ursoaia 3/12, 5. Glubokoe 1/25, 6. Roșcani 1/13, 7. Grigorevka 1/12, 8. Berezchi, destroyed grave, 9. Svetlîi 3/10, 10. Mocra 1/3, 11. Sărăteni 6/4, 12. Mayaki III 9/1, 13. Efimovka 3/5, 14–15. Trapovka 1/8, 16. Semenovka 19/4, 17. Murighiol 4/6, 18. Gura Bîcului 3/2, 19. Mayaki IV 1/1, 20. Răscăeții Noi 2/12, 21. Bashtanovka 4/25, 22. Revova 3/7, 23. Crasnoe 9/23, 24. Giurgiulești 2/4, 25. Novokamenka 1/mound, 26. Nicolscoe 10/4, 27. Olănești 6/14, 28. Vlădești 1/2, 29. Olănești 1/26, 30. Yasski 6/14, 31. Sadovoe 1/14, 32. Polevoe 2/6, 33. Belyaevka 1/20, 34. Novaya Dolina 1/2, 35. Monashi 1/8, 36. Talmaza 3/15, 37. Olănești 13/2, 38. Novokamenka 1/5, 39. Dubăsarii Vechi 1/28, 40. Grigorăuca 1/8 (number of the kurgan/number of the grave) (See Annex I)

or placed in pairs) in the upper part of the vessel's body are one of the mandatory morphological elements. Nearly two-thirds of these vessels are decorated by the imprints of cord (sometimes together with round incisions), which compose complex geometric (*Fig. 1.1–11*) or simple linear compositions (*Fig. 1.12–16*). In rare cases, bottoms were also decorated (*Fig. 1.2*).

From the metrical perspective (*Fig. 2*), these vessels represent a relatively compact "homogenous" group of artifacts with the height of 7.7–8 to 20 cm and maximal diameter of 8 to 20–20.5 cm. A relatively small group consists of secondary derived forms, represented by isolated items (about 12–15), differing in their small size, shape and configurations (*Fig. 1.32–40; Figs. 2, 3*).

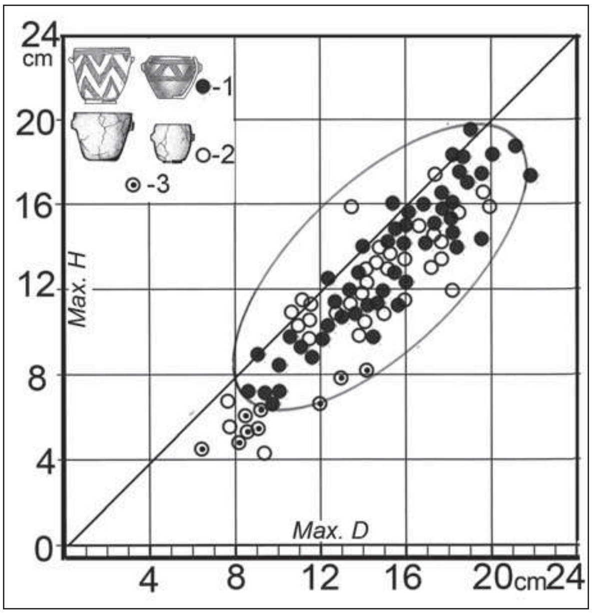

Fig. 2. Metric parameters of the Budzhak type vessels (vertical axis – maximal height, horizontal axis – maximal diameter). 1. ornamented, 2. non-ornamented, 3. derivatives

Let us consider the distribution of these vessels in space. The map (*Fig. 3*) represents all the locations related to Yamnaya culture in the Carpathian-Dniester region by small dots, while the solid line marks the borders of this cultural unit. Special signs mark the findings of Budzhak type vessels.

What does it tell us? All the finds of the analysed vessels are located exclusively in the steppe zone of the overall area. Most of their concentrations are located in the Lower Dniester region and near the Black Sea, in the Dniester and Prut interfluve (*Fig. 3*). Except for three finds in the periphery of this area Mocra (N1), Grigorăuca (N29), and Brăviceni (N30), the area of the Yamnaya culture outside the analysed region does not have Budzhak type vessels.

Thus, the analysis shows that vessels "labelling" the Budzhak "culture" are typical only for the steppe zone, historically known as the Budzhak Steppe. This locational specific approves the term used for our vessels, but not for the "Budzhak culture" according to S. V. Ivanova, sharing the cultural unit to the overall Carpathian-Dniester region (and, maybe, even wider?).

The logic of mapping is very simple. Partial or complete spatial correlation of the analysed phenomena could mean only their chronological difference (i.e. area of Budzhak type vessels represent a chronological horizon when compared to Yamnaya culture spread between Carpathians and Dniester). Now we should identify the sequence of these phenomena. However, let us first return to the vessels and analyse their context, i.e. specifics of burial rites characterising complexes where such vessels were found.

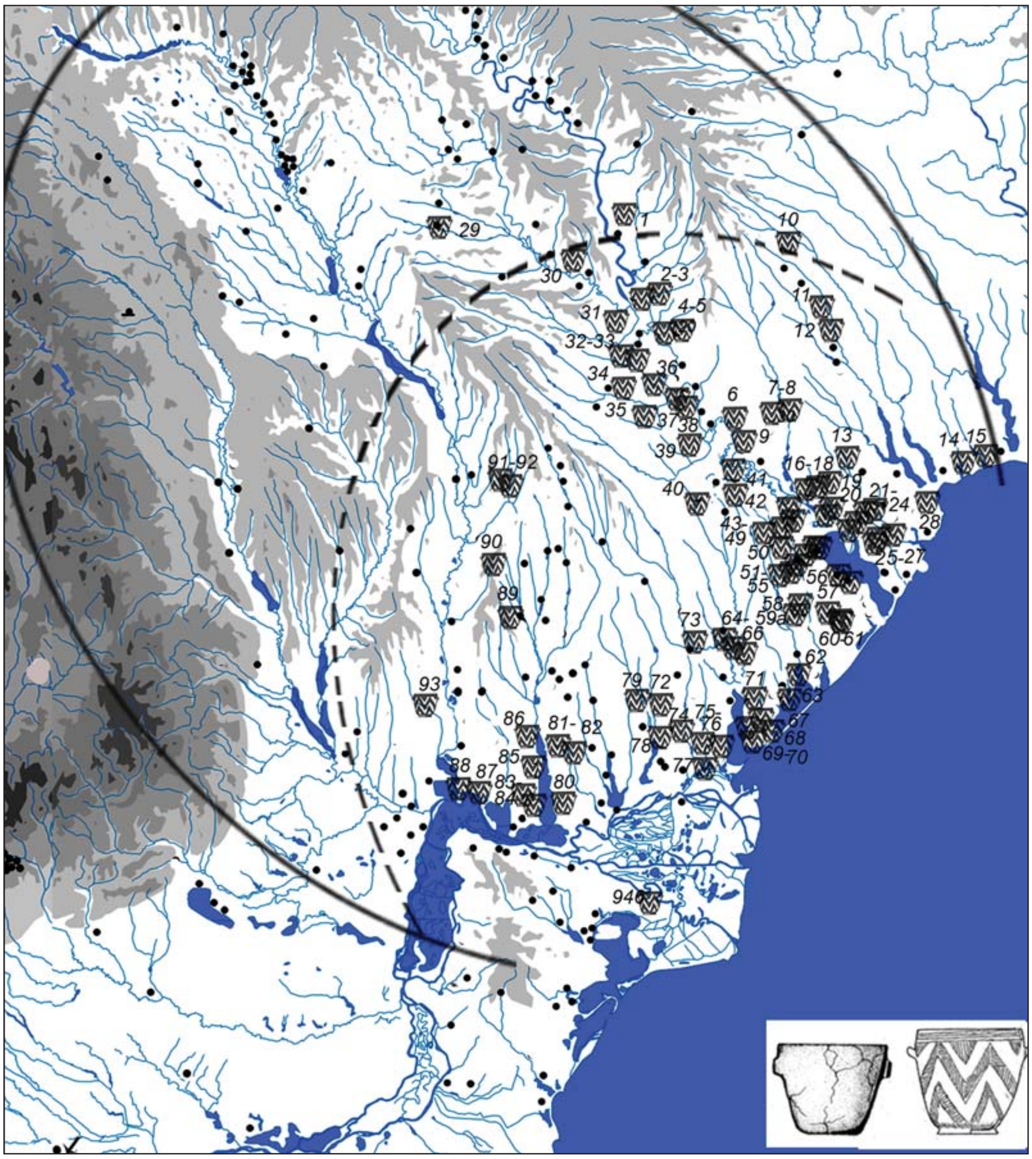

Fig. 3. Location of the Budzak type vessels (Budzhak type sites area is marked by dotted line) in comparison to Yamnaya culture sites area in Carpathians-Dniester region (solid line). Numbering corresponds to the number of Annex I: 1. Mocra 1/3, 2–3. Dubăsarii Noi 4/4, 31/7, 4–5. Crasnoe 9/23, 6. Tiraspol area, 7–8. Nicolscoe 7/45, 10/4, 9. Slobozia 1/25, 10. Grigorevka 1/12, 11. Revova 3/7, 12. Velikozimenovo 1/2, 13. Shcherbanka 1/10, 14. Starye Bilyary 1/14, 15. Vapnyarka 4/16, 16–18. Yasski 2/5, 3/6, 6/14, 19–20. Belyaevka 1/20, 2/10, 21–24. Mayaki III, 2/7, IV, 1/1, 3/1, 9/1, 25–27. Efimovka 2/14, 3/5, 6/6, 28. Novaya Dolina 1/2, 29. Grigorăuca 1/8, 30. Brăviceni 16/9, 31. Dubăsarii Vechi 1/28, 32–33. Corjovo 1/4, 2/13, 34. Chirca 1/7, 35. Beriozchi, destroyed grave, 36. Roșcani 1/13, 37–38. Gura Bîcului 3/2, 5/13, 39. Ursoaia 3/12, 40. Cîrnățeni 6/9, 41. Talmaza 3/15, 42. Ciobruci 4/10, 43. Răscăeții Noi 2/12, 44. Popeasca 1/9, 45. Purcari 1/23, 46–49. Olănești 1/26, 1/26; 6/4, 13/2, 50. Căplani 1/15, 51–55. Semenovka 2/2, 8/18, 12/2, 14/21, 19/4, 56–57. Sadovoe 1/14, 1/18, 58–59a. Polevoe 1/5, 1/8, 2/6, 60–61. Shirokoe 5/3, 5/6, 62. Diviziya 2 6/3, 63. Zheltyy Yar 3/12, 64–66. Zarya Mikhailovka 3/6, 3/8, 3/12, 67–68. Trapovka 1/8, 1/8, 69–70. Vishnevoe 17/31, 17/36, 71. Novoselitsa 19/19, 72. Bashtanovka 4/25, 73. Glubokoe 1/25, 74. Strumok 5/6, 75–76. Nerushay 9/56, 9/74, 77. Primorskoe 1/34, 78. Chervonyy Yar I 1/2, 79. Kholmskoe 1/4, 80. Kislitsa 8/16, 81–82. Novokamenka 1/5, 1/mound, 83–84. Plavni 9/12, 15/5, 85. Nagornoe 14/15, 86. Frikatsey 10/14, 87. Etulia II, 1/6, 88. Giurgiulești 2/14, 89. Balabanu 13/10, 90. Svetlîi 3/10, 91–92. Sărăteni 3/13, 6/4, 93. Vlădești T.216 1/2, 94. Murighiol 4/6 (number of the kurgan/number of the grave)

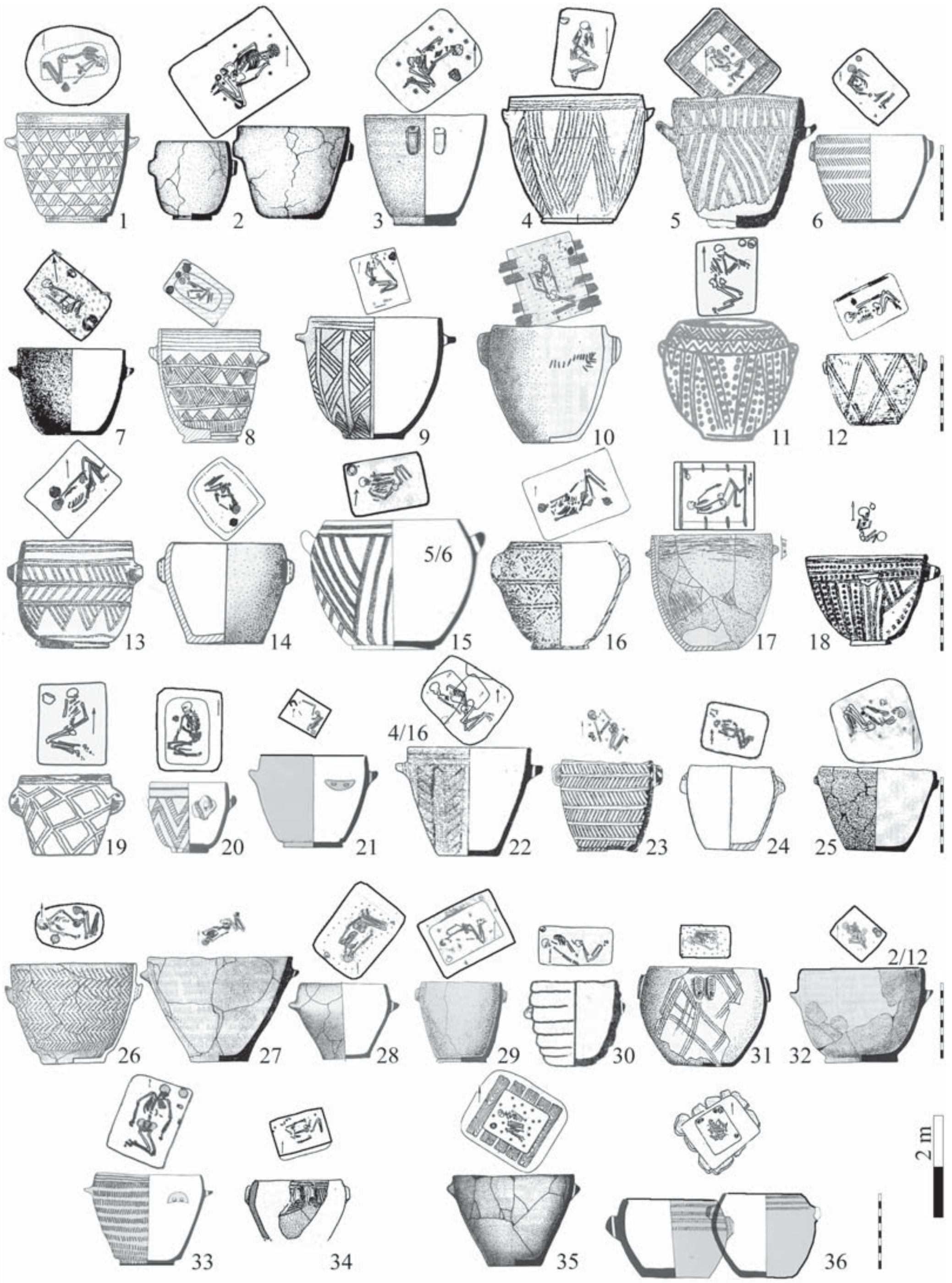

Fig. 4. Budzhak type vessels in context (1–18. left side, 19–32. right side, 33–34. on the back with the legs raised at the knees, 35–36. dismembered). 1. Dubăsari 4/4, 2. Crasnoe 9/23, 3. Nicolscoe 10/4, 4. Glubokoe 1/25, 5. Ursoaia 3/12, 6. Sărăteni 6/4, 7. Sadovoe 1/18, 8. Semenovka 8/18, 9. Diviziya 2, 6/3, 10. Velikozimenovo 1/2, 11. Efimovka 2/14, 12. Gura Bîcului 5/13, 13. Grigorevka 1/12, 14. Semenovka 2/2, 15. Shirokoe 5/6, 16. Nagornoe 14/15, 17. Vlădești 1/2, 18. Primorskoe 1/34, 19. Efimovka 6/6, 20. Mayaki III 3/1, 21. Mayaki IV 1/1, 22. Vapnyarka 4/16, 23. Purcari 1/23, 24. Plavni 15/5, 25. Ciobruciu 4/10, 26. Corjevo 8/4, 27. Olănești 6/14, 28. Sărăteni 3/13, 29. Popiasca 1/9, 30. Kislitsa 8/16, 31. Slobozia 1/25, 32. Răscăeții Noi 2/12, 33. Mayaki III 2/7, 34. Novoselitsa 19/19, 35. Nicolscoe 7/45, 36. Trapovka 1/8 (number of the kurgan/number of the grave) (See Annex I)

For the moment, data from 94 complexes is available. For illustrative purposes, a series composed of half-known cases and reflecting all known variations is provided (*Fig. 4*[1]; *Annex I*).

With three exceptions, the analysed vessels were found near individuals laid on the back, with an inclination on the right or left side. The distribution is as follows. 51 cases (61.4%) represent burials on the left side (*Fig. 4.1–18; Annex I*), out of which only two burials were in significantly crouched position (Yasski 2/5 and Primorskoe 1/34 – *Fig. 4.18*). 30 cases (36.1%) represent burials on the right side (*Fig. 4.19–32; Annex I*), out of which two burials were in a significantly crouched position (Slobodzeia 1/25 and Răscăieții Noi 2/12 – *Fig. 4.31–32*).

Exceptions include two burials (2.4%), in which vessels were found near burials in supine position with the arms along the body and, probably, legs raised at the knees and fallen to the left (*Fig. 4.33–34*). Four other examples represent disarticulated bodies (*Fig. 4.35–36*).

Therefore, Budzhak type vessels (with a few exceptions) are typical for the burials with individuals laid on the back, with an inclination on the left or right side. It is important to admit that both variations of the position are distributed in nearly equal proportion (51 and 30). Their orientation is also similar, representing northern (310º to 75º) and southeastern direction (135º to 285º) (*Fig. 5*).

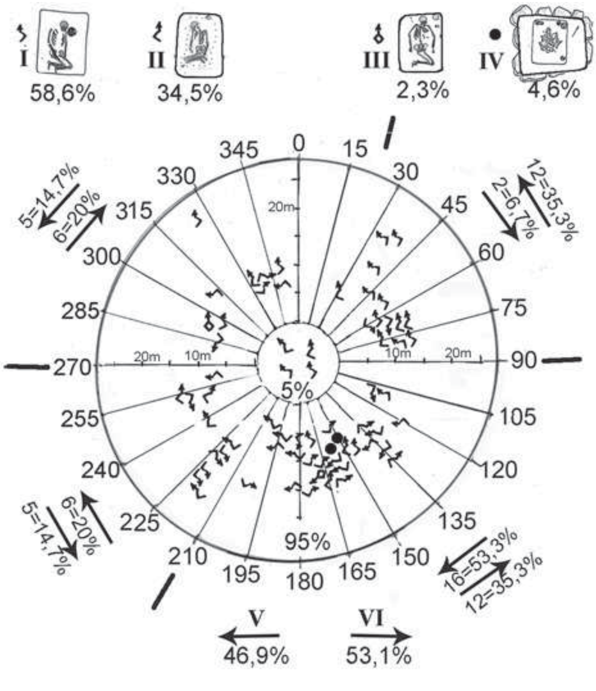

Fig. 5. Diagnostic characteristics of burials with Budzhak type vessels. Burial positions: I. left side, II. right side, III. on the back with the legs raised at the knees, IV. disarticulated. Main burials (in the centre) – 5%, secondary burials, peripheral in a mound – 95%. Orientation: V – clockwise, VI – counterclock-wise

This correlation identifies that the steppe zone differs from Yamnaya culture in the Carpathian-Dniester region not only by specific ceramics (Budzhak type vessels), but also specific funeral rites (individuals laid on the back, with an inclination on the right or left side). Then, what stands behind supine burials with legs raised at the knees, which are known in both steppe and forest-steppe zones? Do they represent the other culture? The answer brings us to the already expressed assumption/conclusion considering the chronological difference between the two burial types representing two periods of the same culture, at least in the Budzhak area. This conclusion contradicts S. V. Ivanova's interpretations and leaves them ungrounded.

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[1] One should take into account that this figure groups burials on the left side and right side also considering their orientation to the north or southeast.

Following the logic of spatial-chronological analysis, chronological sequences could be approached through the position of at least one unit (earliest or latest). This automatically leads to the identification of the second unit's chronology.

Considering the specifics of the dataset, we will address the materials of steppe, Budzhak groups. There are enough arguments in respect to its belonging to the late horizon of Yamnaya culture not only in the steppe but in the overall Carpathian-Dniester region.

The books dealing with a detailed classification of Yamnaya culture burial rites (Merpert 1974; Yarovoy 1985; Dergachev 1986) demonstrate that the burial rite including the supine position on the back with legs raised at the knees originated in the east. Its appearance in the Carpathian-Dniester region and spread in steppe and forest-steppe zones was related to the migration of people sharing the tradition. Since the Budzhak group demonstrates the predominance of burials with individuals laid on the back, with an inclination on the right or left side, 1) this funeral rite is later than the one representing supine burials with the legs raised at the knees, and 2) Budzhak complexes are later than the other complexes in the steppe and forest-steppe zone.

Another key argument. Burials with crouched skeletons, with rare exceptions, are not represented by the primary burials and, as a rule, are sunk into the mounds with the main burials laid on their backs. If these mounds do contain the main burials crouched on their sides, they do not provide secondary burials crouched on the back (of course, with rare exceptions) or do not contain any secondary burials at all.

Among barrows with burials including Budzhak type vessels (*Annex I*), only in four kurgans burials with such pottery are the main graves. In all other cases, these burials are secondary. Some specifics of these features should also be considered.

Barrow 1 near Grigorivka village (*Fig. 6.*A), in which the main burial was crouched on the side and contained a Budzhak type vessel, also included six secondary graves referred to Yamnaya culture (their location followed a circle). The position of the buried individuals was the same in all cases. Three barrows of the Mayaki IV cemetery (*Fig. 6.B–D*), in which main burials included Budzhak type vessels, did not have any secondary graves belonging to the Yamnaya culture, suggesting their short-term usage.

The planigraphy of barrows composed of three to four mounds, including 20–30 and sometimes even more graves belonging to different cultures, can be used as an additional argument towards the later chronological position of Budzhak complexes.

As widely known, Yamnaya and Catacomb culture populations practiced barrow erecting but also buried their deceased in secondary graves. The secondary graves were sometimes located in the central part of barrows, but more often they are located at the edges following a certain principle, mainly following a circle. The distance from the centre to such a circle depends on the barrow size. Therefore, the location of burials according to a principle reflects their sequence, somehow reminding tree rings, but with the extended time difference.

The four examples presented below are chosen using the following criteria (*Fig. 7*)[2]: 1) long-time used barrows including several mounds, and 2) supine burial on the back and (highly probable) legs raised at the knees, and also burials of the Budzhak type, i.e. laid on the back, with an inclination on the right or left side and correlated by the analysed vessel type or other materials discussed below (pendants, bone arrowheads, flint axes, etc.).

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[2] Barrow's plans represent only the analysed burials; earlier Usatovo and Yamnaya graves (supine with legs raised at the knees) and chronological unidentified cenotaphs are marked by thin contours; probable Budzhak burials are marked by solid lines, and Catacomb graves are marked by thin lines with grey infilling.

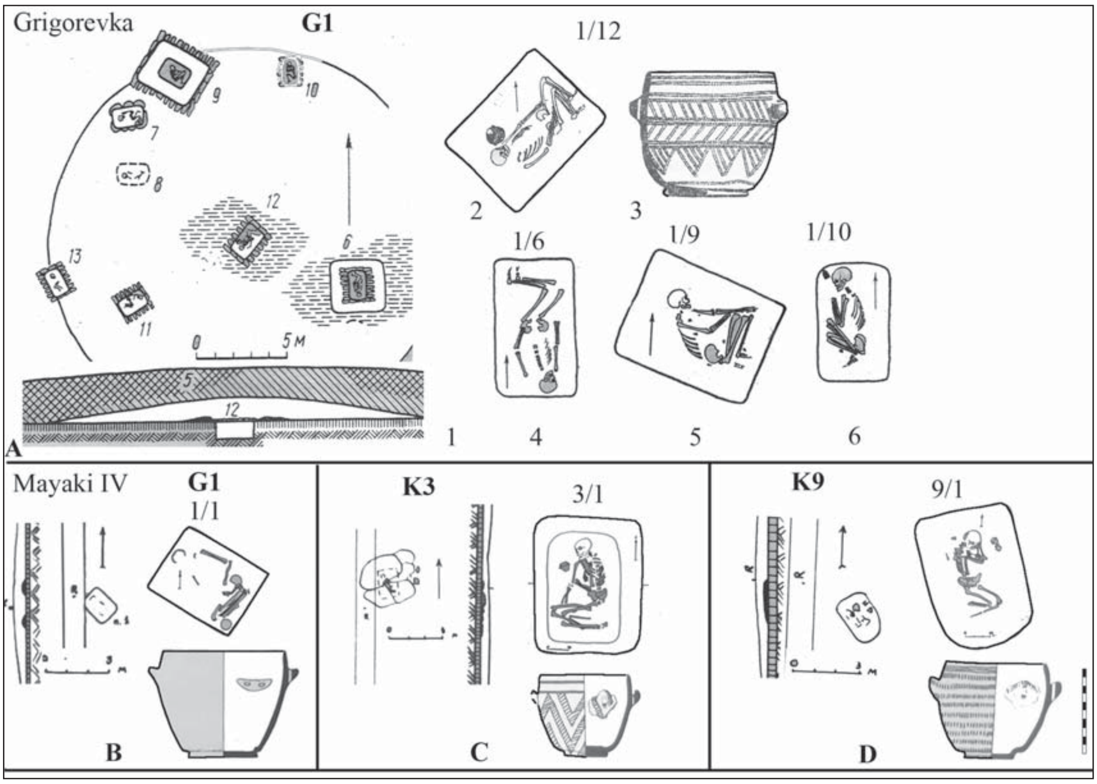

Fig. 6. Kurgans with main (central) burials including Budzhak type vessels.
(after: A. Subbotin 1982; B–D. Chernyakov et al. 1982; 1983)

Barrow 7 near the village of Nicolscoe (*Fig. 7.A*). Its main grave (42) belongs to the Yamnaya culture, the individual being laid supine with raised knees. The barrow has four secondary graves (25, 28, 44 and 47) and four graves of the Budzhak type (7, 43, 45–46), out of which one includes the Budzhak type vessel *(Fig. 7.A/2–6*). The four graves are located in the first mound, the other four are located outside of it (*Fig.* 7.A/*1*). Therefore, the latter four referred to the Budzhak type are later than the former four, characterised by the supine position with the legs raised at the knees.

Barrow 1 near the village of Glubokoe (*Fig. 7.B*). Usatovo type burial 16 is the main grave. The barrow includes 17 Yamnaya graves, out of which six are characterised by the supine position with the legs raised in the knees (5, 7, 9, 14, 21, 26), seven (11–13, 22–25) belong to the Budzhak type, and the other four are cenotaphs or typologically undistinguishable (6, 15, 19–20). Three burials of the first group characterised by the supine position are located inside the Usatovo stone construction (5, 9, 14), while three others are located to the east, in close relation to this stone construction. Among the secondary Budzhak type burials only one (22) is located in the perimeter of the stone construction, four graves are located in the western part of the barrow following the circle principle (12, 13, 23–24), and two more burials are spatially distinct (11, 25). The planigraphy of these burials suggests that the barrow included at least two additional mounds and the initial mound with stone construction. These mounds are represented in the profile section, but not on the barrow's plan.

The closest to the centre mound included three supine burials (7, 21, and 26) and one Budzhak type burial (13). The peripheral mound included one supine burial (6) and five Budzhak type graves (11, 12, 23–25) (*Fig. 7.B/1*). It is important to underline that the former group includes a burial with the typical Budzhak type vessel and copper bracelet discussed below (*Fig. 7.B/2–11*). Considering the peripheral

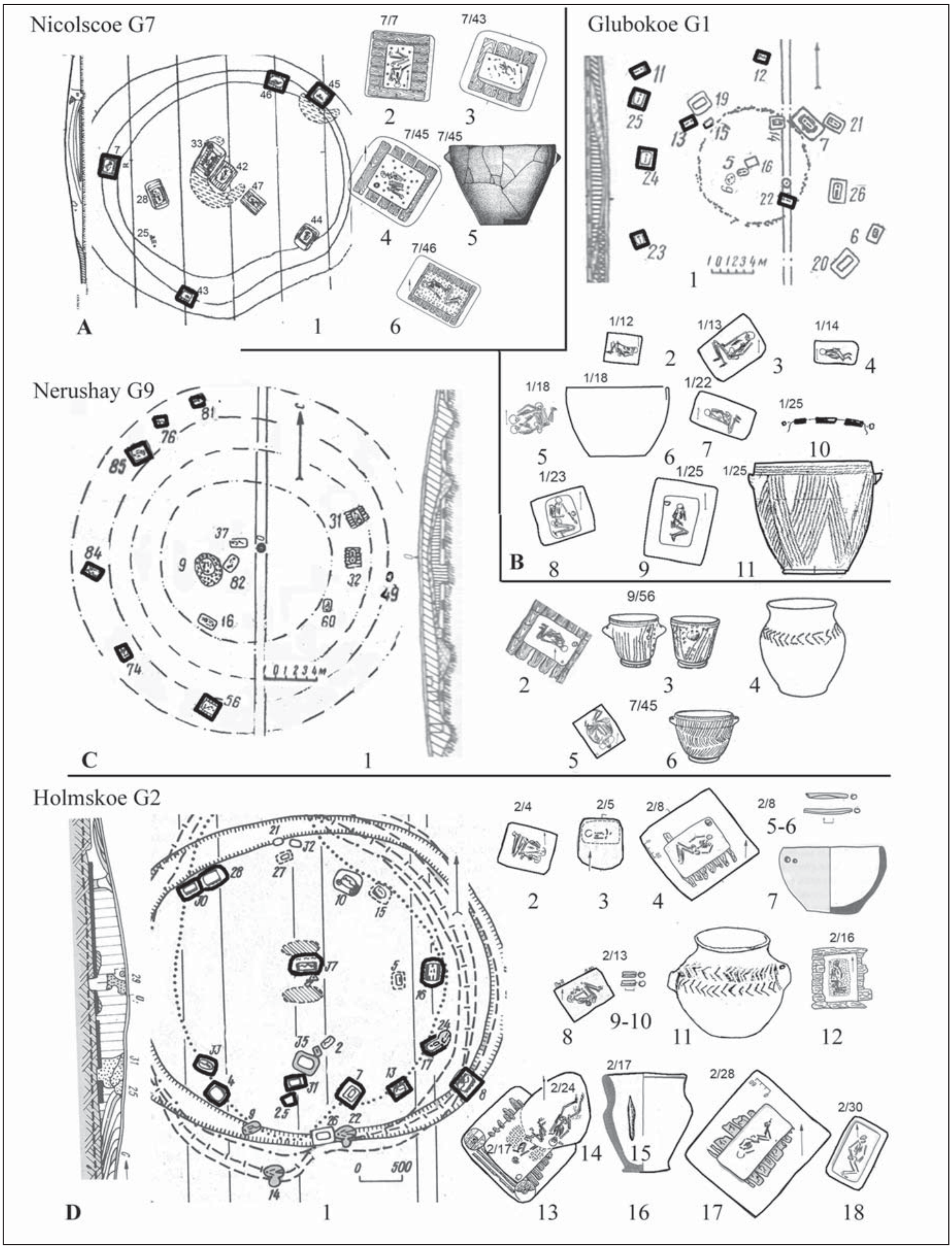

Fig. 7. Examples of different Yamnaya culture burial plans (A–C) compared to Catacomb graves plans (D). Kurgan plans include only the analysed burials: the earliest Usatovo and/or Yamnaya burials with the legs raised at the knees and chronologically 20 unidentified cenotaphs are marked by thin lines, presumably Budzhak burials are marked by solid lines, Catacomb burials are marked by thin lines filled by grey (after: A. Agulnikov – Sava 2004; B–C. Shmagliy – Chernyakov 1970; D. Chernyakov – Stanko – Gudkova 1986)

location of Budzhak type graves compared to the location of supine burials with the legs raised at the knees, Budzhak type graves are later than the former group.

Barrow 9 near the village of Nerushay (*Fig. 7.*C). According to the field observations, this kurgan included four mounds, the earliest of which is related to the Usatovo grave (82). The kurgan included at least 12 Yamnaya burials, out of which six are supine with the legs raised at the knees (9, 16, 31–32, 37, 60) and the other six are laid on the back, with an inclination on the right or left side (including two graves with Budzhak type vessels: 56, 74, 76, 81, 84–85)[3]. Unfortunately, except for the graves with vessels, the other Budzhak type burials were not illustrated in the publication (*Fig. 7.*C*/2–6*). According to barrow's plan (*Fig. 7.*C*/1*), supine burials on the back with the legs raised at the knees are located in the first and the second mounds, while all the Budzhak type burials are located in the western semi-circle in the fourth mound. Therefore, the latter group of burials is later than the former.

Barrow 2 near the village of Kholmskoe is important for consideration because of the well-documented stratigraphy and representative sample of Yamnaya and Catacomb graves (*Fig. 7.D*). Unfortunately, the illustration of the main grave is not available. According to the field report and description in publication (Chernyakov – Stanko – Gudkova 1986, 80–81), the position is characterised as "supine… Legs with raised knees were fallen to the left". However, from the description of the hand's location, "the right hand is flexed in a cubit, its wrist is placed to the right part of the body; the left hand is located along the body" we can easily reconstruct the typical Budzhak position, laid on the back, with an inclination on the left side. Therefore, all the other Yamnaya culture graves in this barrow are also referred to the Budzhak type. This is confirmed by burials' positions and inventory (vessels, copper beads, bone arrowhead) (*Fig. 7.D/2–13, 15–18*).

Comparison of Budzhak type and Catacomb culture graves, as it comes from the general plan (*Fig. 7.D/1*), indicates that the Catacomb graves were of the secondary character located in the same mound in the southern periphery of the barrow as Budzhak type burials. This indicates their chronological similarity, if not partial synchronicity. This statement is confirmed by the stratigraphy of the Yamnaya culture grave 17 disturbed by the Catacomb grave 24. "Burial 24… partly disturbed it [burial 17 – V.D.], being placed slightly above its bottom. During the burial process in grave 24, the wooden overlay of grave 17 was not rotted yet, and the grave was not filled by soil. This made possible the usage of empty space for placing the new burial 24. Wooden constructions of the overlay of grave 17 collapsed later and were fallen on the skeleton in grave 24" (Chernyakov – Stanko – Gudkova 1986, 77). Therefore, without any doubt, there is a co-habitation between Late Yamnaya and Early Catacomb populations. In its turn, this confirms the hypothesis on the later chronological position of Budzhak type burials compared to Yamnaya complexes with the supine position.

Two other cases documenting the partial synchronicity of Budzhak and Catacomb populations are as follows. The secondary grave 31 in the barrow 17 near the village of Vishnevoe in a "Classical" catacomb includes burial in the Budzhak position accompanied by the typical Budzhak vessel (*Fig. 8.1*). In grave 10 of barrow 2 near the village of Belyaevka in a non-typical catacomb (considering the construction techniques), the entrance pit and the grave included fragments of the same vessel of Budzhak type (*Fig. 8.2*).

The chronological position of Budzhak burials is indirectly confirmed by two vessels found in burials with deceased crouched on a side position in the barrows located in the Lower Southern Bug region (*Fig. 8.3–4*). According to O.G. Shaposhnikova's scheme, this burial rite is typical for the two latest (III and IV) groups of Southern Bug variation of Yamnaya culture (Shaposhnikova *et al.* 1986, 51).

Summarising the observations considering the spatial and stratigraphic position of burials including Budzhak type vessels, these complexes are later than Yamnaya burials in supine position with the legs

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[3] Cultural attribution of the grave 49 with sharp-shaped bottom ornamented by teeth-shaped stamp remains an issue.

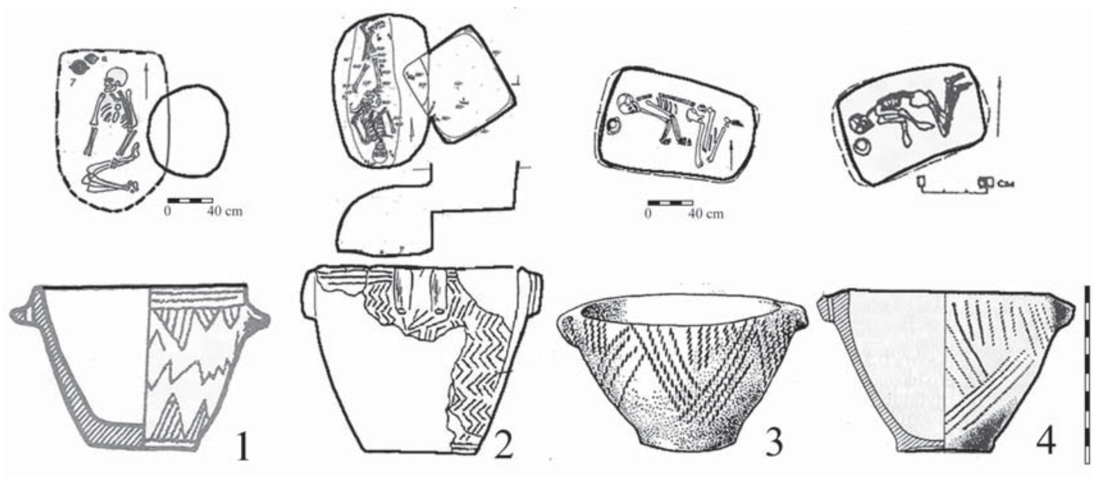


Fig. 8. Catacomb culture complexes (1–2) from the Budzhak steppe and Late Yamnaya culture of the Southern Bug region (3–4) with Budzhak type vessels: 1. Vishnevoe 17/31, 2. Belyaevka 2/10, 3. Kovalevka VIII 1/10, 4. Korchino 1/10 (after: 1. Dvoryaninov – Dzigovskiy – Subbotin 1985; 2. Petrenko 2007; 3. Shaposhnikova – Fomenko – Dovzhenko 1986; 4. Kovpanenko – Gavriliuk 2004)

raised at the knees and represent a distinct variation of Yamnaya culture in the steppe zone between the Carpathians and the Dniester.

To verify this hypothesis, let us analyse ornaments. More specifically, let us consider spiral-shaped temple rings and bracelets (*Fig. 9.A–B*) being the most widely spread ornaments of Yamnaya culture in the analysed region.

Spiral-shaped rings. According to their form, rings are subdivided into two types: rings with one–two or four–five loops (*Fig. 9.A/1–8*), and bagel-shaped rings in a form of a non-joint circle, somewhat

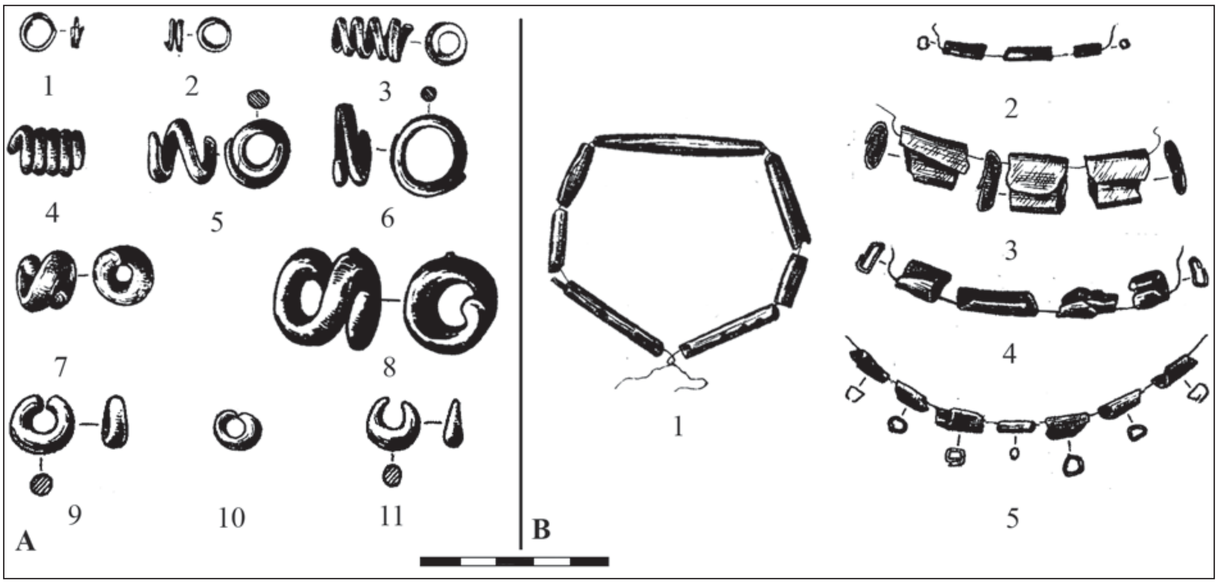


Fig. 9. A. spiral-shaped temple rings: 1. Olănești 1/16, 2. Plavni 26/7, 3. Dobroaleksandrovka 1/5, 4. Ciobruciu 1/11, 5. Giurgiulești 1/9, 6. Trapovka 1/9, 7. Shirokoe (Alkalia) 33/3, 8. Taraclia 2, 10/10, bagel-shaped: 9. Roșcani 1/19, 10. Orhei 1/2, 11. Brăviceni 2/7 (1, 3, 5, 7–11. silver, 2. gold, 4, 6. copper?) (See Annex II). B. composed bracelets: 1. Liman 3A/30, 2. Glubokoe 1/24, 3. Alkalia 33/3, 4. Roșcani 1/13, 5. Borisovka 9/6 (copper?) (See Annex III)

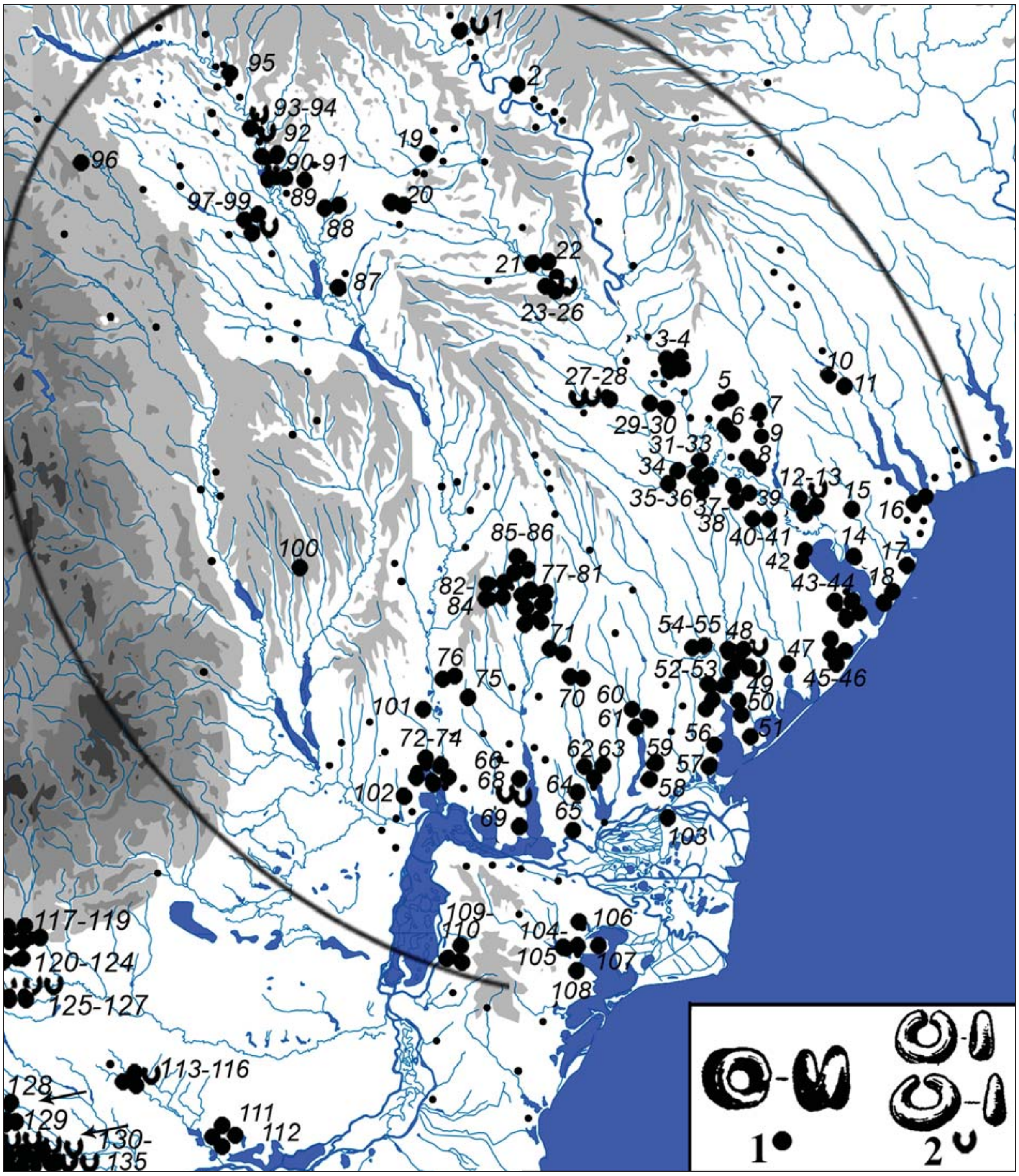


Fig. 10. Yamnaya culture complexes with spiral-shaped rings from Carpathians – Dniester region (the numbering corresponds to the number of complexes and the number of Annex II): 1. Pisarivka 5/1, 2. Cuzmin 3/2, 3–4. Crasnoe 2/5, 9/19, 5. Blizhniy Khutor 3/1, 6. Tiraspol II 3/18, 7. Nicolscoe 1/11, 8. Ciobruci II 1/11, 9. Glinoe Sad 1/4, 10. Katarzhino 1/11, 11. Baranovo-Soldatskaya Slava 1/10, 12–13. Yasski 1/18, 5/22, 14. Efimovka 10/10, 15. Dobroaleksandrovka 1/5, 16. Odessa-Slobodka-Romanovka 1/15, 17. Sanzheyka 1/8, 18. Karolino-Bugaz 1/1, 19. Mărculești 3/10, 20. Bursuceni 1/12, 21. Brînzenii Noi 1/2, 22. Ciocîlteni 5/6, 23–26. Brăviceni 1/14, 2/8, 4/4, 7/2; 27–28. Orhei 1/2, 1/6, 29–30. Roșcani 1/19, 2/3, 31–33. Gura Bîcului 3/13, 5/3, 7/1, 34. Hagimus 2/7, 35–36. Căușeni II 1/10, 1/13, 37–38. Talmaza I 1/6, 3/4, 39. Purcari 1/31, 40–41. Olănești 1/16, 6/8, 42. Semenovka 11/5, 43–44. Sadovoe 1/26, 1/32, 45–46. Shirokoe/Alkaliy 33/7, 33/9,

47. Diviziya II 5/8, 48. Belolese 7/4, 49–50. Novoselitsa 19/11, 21/1, 51. Trapovka 16/9, 52–53. Liman 3A/52, 7/3, 54–55. Glubokoe 1/7, 1/26, 56. Nerushay 1/14, 57. Primorskoe 1/32, 58. Parapory 1/20, 59. Shevchenkovo 3/6, 60–61. Kholmskoe 2/37, 8/6, 62–63. Ostrovnoe 2/6, 2/7, 64. Utkonosovka 6/1, 65. Bogatoe 2/11, 66–68. Plavni 8/31, 25/1, 26/7, 69. Mrestnota Mogila 2/7, 70. Kurchi 20/16, 71. Ogorodnoe III 1/6, 72–74. Giurgiulești 2/9, 3/8, 5/5, 75. Găvănoasa 4/3, 76. Crihana Veche 9/17, 77–81. Taraclia II 3/7, 10/10, 10/19, 14/3, 18/10, 82–84. Balabanu I 13/12, 13/15, Balabanu II, 2/1, 85–86. Cazaclia 17/3, 23/10, 87. Petrești II 1/8, 88. Iablona 1/17, 89. Duruitoarea Nouă 5/5, 90–91. Cuconeștii Vechi-Dumeni 9/21, 12/4, 92. Corpaci 8/12, 93–94. Bădragii Vechi 6/7, 25/12, 95. Tețcani II 1/10, 96. Broșteni 1/1, 97–99. Glăvăneștii Vechi 1/10, 1/12, II/3, 100. Ivănești, 101. Vlădești 243/2, 102. Vânători 222/13, 103. Chilia Veche 1/89, 104–105. Mihai Bravu 1/3, 1/4, 106. Sabangia 3/2, 107. Zebil-Movila Sărată, 108. Enisala, 109–110. Rahman 1/2, 2/3, 111–112. Sultana-Movila mare 1/1, 1/5, 113–116. Gurbănești 1/2, 2/7, 2/9, 2/12, 117–119. Blejoi III/1, III/3, IV/1, 120–124. Ariceștii-Rahtivan I/1, I/3, IV/4A, IV/5B, VII/2, 125–127. Ploiești-Triaj I/3, II/15, II/20, 128. Verbița 2/?, 129. Plenița Măgura Mare/1, 130–135. Zimnicea – flat cemetery, burials: 4, 9, 11, 16, 20, 24 (number of the kurgan/number of the grave)

thickened in the middle part, also known as crescent rings (*Fig. 9.A/9–11*). The first type quantitatively dominates; such rings are usually of silver, rarely they are made of copper or gold. The diameter varies from 0.5 to 1.2–2 cm with the diameter of wire reaching from 1 to 3–4 mm. Crescent rings are found rarely. They were mainly made of silver. The diameter is about 1 cm.

Incomplete data on the occurrence of these pendants in the Carpathian-Dniester region are available in the paper by L.V. Subbotin (2003, 34), and for the territory of Romania in the papers by A. Frînculeasa and colleagues (Frînculeasa *et al.* 2019, Annex II). Generally, we have registered 135 burials with temple pendants for the Carpathian-Dniester region and Wallachia. Each of them contains one, more often two, and sometimes three or five pendants, respectively, their total number is slightly more than 200, 197 of which are spiral-shaped, and 21 are bagel-shaped or ring-shaped with open ends and non-joint circles (*Annex II*).

As a rule, such rings are found near the temple bone, while they are most typical for children's graves, but also known for male and female burials.

Let us discuss geography and context. As represented in *Figure 10*, finds of this category are distributed across the overall area of Yamnaya culture between the Carpathians and the Dniester. Concentrations are visible in the steppe zone along the Black Sea coast, in the Lower and Middle Dniester and Prut, and partly in the Lower Danube region. In other words, we discuss the territory of Yamnaya culture sites distribution (*Fig. 10:* small dots).

What is it about their context? It is reflected in two figures, which include 45 complexes (out of 115), which have identified positions of burials and include temple rings (*Figs. 11* and *12*).

First of all, temple rings are rarely associated with the other kinds of burial inventory. The sample (45 graves) is represented by six–seven vessels (*Fig. 11.4, 14, 20–21; Fig. 12.1, 11, 16*, four–five tools, weapon or ornaments (*Fig. 11.15, 20; Fig. 12.13*). Two cases are the wheels from wooden wagons (*Fig. 11.21–22*).

However, the most important is the correlation between rings types and funeral rites. The Carpathian-Dniester region is characterised by the following statistics: in 76 cases (66.1%) rings accompanied supine with legs raised at the knees (*Fig. 11.1–22; Fig. 12.2–3, 5, 12*), in 25 cases (21.7%) they were found in graves with individuals laid on the back, with an inclination on the right side or significantly crouched position (*Fig. 11.23–27*), and in 14 cases (12.2%) they accompanied individuals laid on the back, with an inclination on the left side (*Fig. 11.28–30; Fig. 12.8)*. Therefore, the temple rings demonstrate the opposite trend to the Budzhak type vessels (*Fig. 15.1, 3*). If the latter mainly correlates with individuals laid on the back, with an inclination on the left/right side or crouched (97.5%) and only a few (2.5%) –

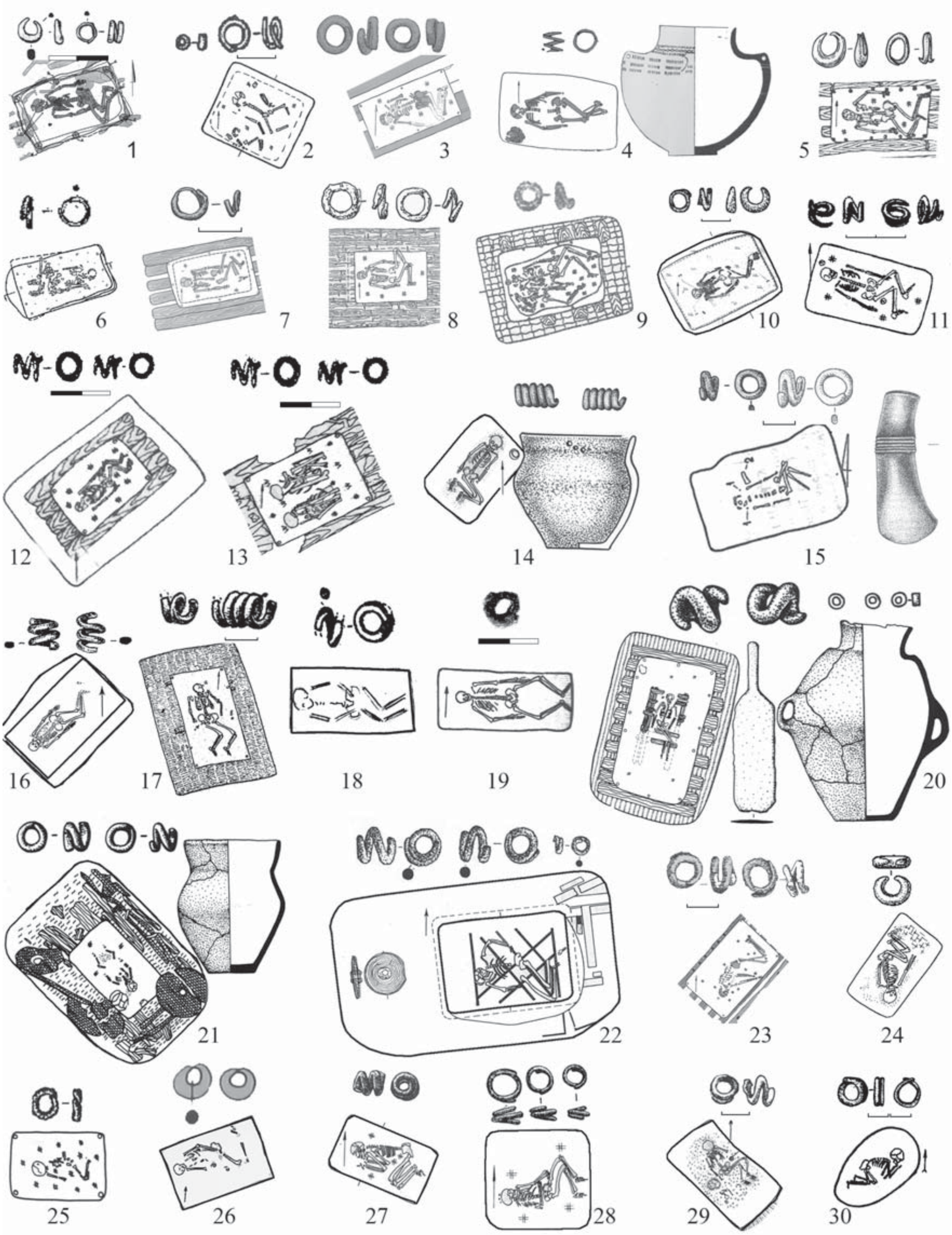


Fig. 11. Spiral-shaped temple rings in context (1–22. supine position with raised legs, 23–30. right and left-side): 1. Pisarivka 5/1, 2. Cuzmin 3/2, 3–4. Bădragii Vechi 6/7, 25/12, 5. Corpaci 8/12, 6. Duruitoarea Nouă 5/5, 7. Petrești 1/8, 8. Iablona 1/17, 9. Mărculești 3/10, 10. Brăviceni 7/2, 11. Crasnoe 2/5, 12. Tiraspol II 3/18, 13. Balabanu II 2/1, 14. Ciobruciu II 1/11, 15. Baranovo «Soldatskaya Slava» 1/10, 16. Sadovoe 1/26, 17. Novoselitsa 19/11, 18. Parapory 1/20, 19. Nerushay 1/14, 20–21. Taraclia II 10/19, 18/10, 22. Giurgiulești 2/9, 23. Talmaza 3/4, 24. Orhei 1/2, 25. Taraclia 2 3/7, 26. Liman 7/3, 27. Nicolscoe 1/11, 28. Purcari 1/31, 29. Brăviceni 2/8, 30. Karolino-Bugaz 1/1 (number of the kurgan/number of the grave) (See Annex II)

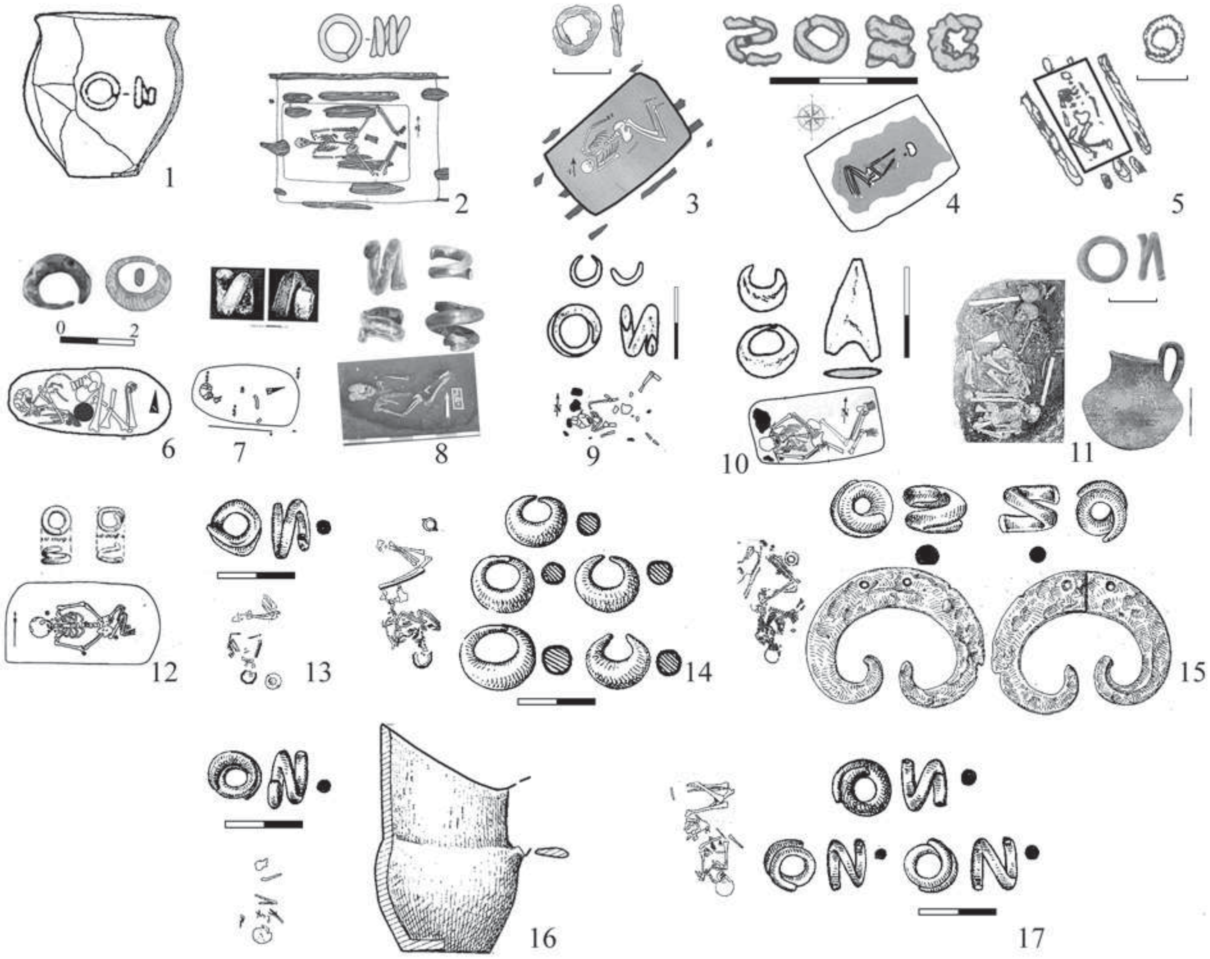


Fig. 12. Spiral-shaped temple rings in context, Romanian sites (2–3, 5, 7, 9–10, 12. supine position with raised legs, 4, 6, 8, 11, 13–17. right and left-side): 1. Broșteni 1/1, 2. Vânători 222/13, 3–4. Rahman 1/2, 2/3, 5. Sabangia 3/1, 6. Smeeni 1/7, 7–8. Blejoi III/1, IV/1, 9–11. Aricești-RahtivanI 1/1, 1/3, 4/5, 12. Plenița-Măgura Mare/1; 13–17. Zimnicea, flat cemetery, graves: 4, 9, 11, 16, 20 (See Annex II)

with those buried crouched on their backs with raised knees, in the case of temple pendants, 66.1% of them fall on supine burials with legs raised at the knees, and only 33.9% on those buried crouched on the left or right sides.

Composed bracelets. These artefacts are characterised by a simple form of round-profile tubes or somewhat flattened staples, fabricated of copper plates. Artifacts of the first group, probably, were placed one after the other on a thread. Artifacts of the second group were joined by a thread. Their length varies from 0.5 to 5–6 cm with a diameter of 0.3–0.6 cm (*Fig. 9.B/1–2, 4–5*). In the case of flattened components, their dimensions in profile reach 0.2 to 0.5–1 cm (*Fig. 9.B/3*).

There are known 75 burials (*Fig. 13.1–75*) for the Carpathian-Dniester region, they contain from one to six to seven threads (166 threads in total). Many of them are reflected in the book by L.V. Subbotin (2003, 33–34). Another seven burials with 9 tubes are known from the Romanian Dobroudja and the barrows of the Prahova group (*Fig. 13.72–75; Annex III*).

Unlike spiral-shaped rings, composed bracelets were being worn on wrists of both arms (18 – on the left arm, 16 – on the right one). They are likely associated with men, women and children's

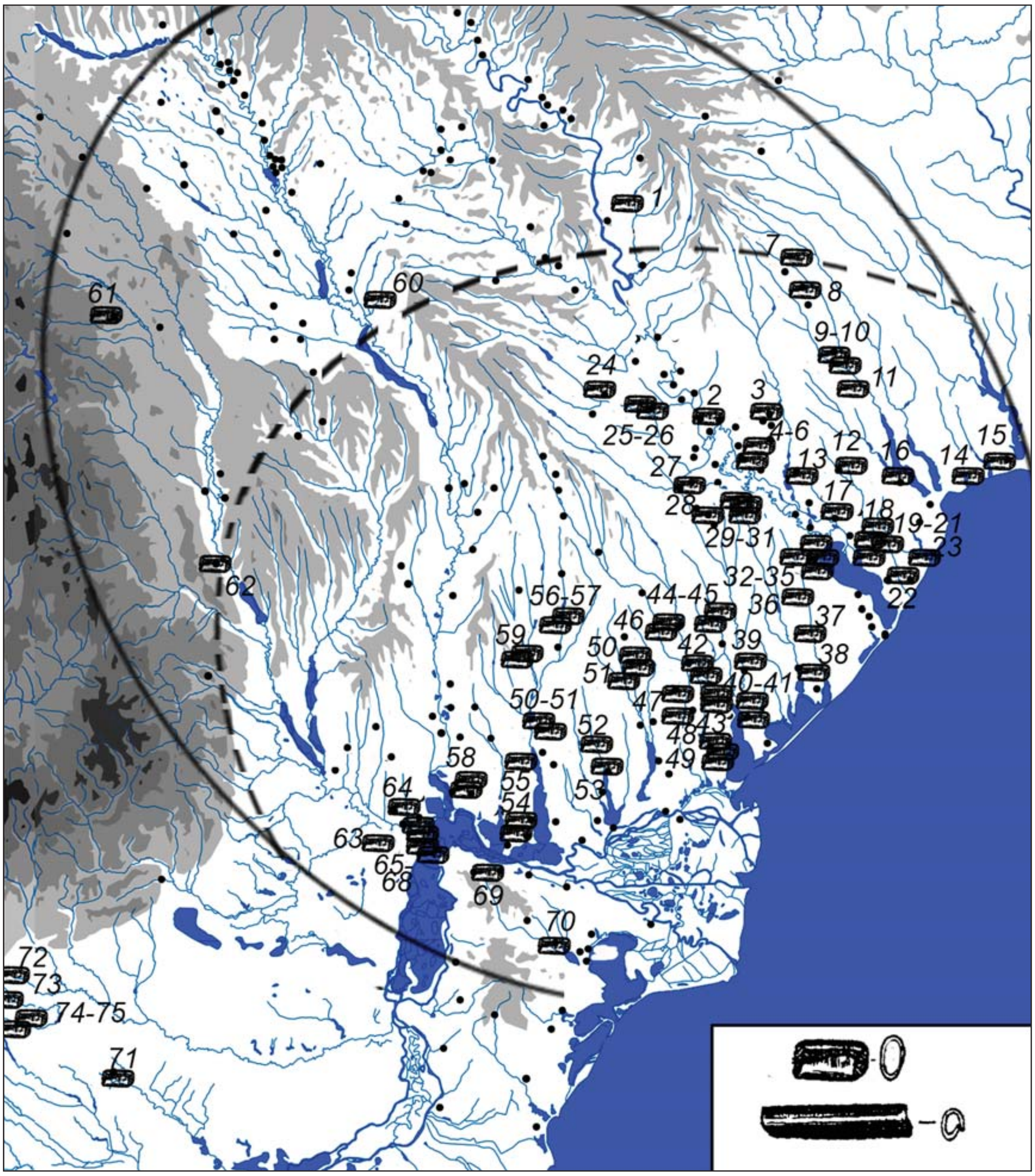


Fig. 13. Location of composed bracelets made of thin copper plates (locations numbering corresponds to the numbers of Annex III): 1. Mocra 1/6, 2. Târnauca II 2/17, 3. Nicolscoe 7/7, 4–6. Slobozeia 1/21, 4/4, 4/5, 7. Grigorevka 1/12, 8. Novogrigorovka-Liubasha 2/2, 9–10. Katarzhino 1/1, 1/21, 11. Baranovo 1/9, 12. Shcherbanka 1/7, 13. Limanskoe 4/4, 14. Starye Biliary 1/14, 15. Vapnyarka 4/16, 16. Kholodnaya Balka 1/15, 17. Yasski 5/2, 18. Petrodolinskoe 1/9, 19–21. Nikolaevka/Efimovka 2/23, 6/3, 10/7, 22. Novogradovka 1/4, 23. Aleksandrovka 1/32A, 24. Mereni II 1/3, 25–26. Roșcani 1/13, 5/7, 27. Cîrnățeni 2/10, 28. Ștefan Vodă II 1/7, 29–31. Slobozia I 1/15; II 4/4, 4/5, 32–35. Semenovka 2/2, 8/15, 8/16, 19/9, 36. Podgorodnoe/Krestovaya mogila 1/19, 37. Shirokoe/Alkalia 33/3, 38. Diviziya II 6/1, 39. Belolese 11/9, 40–41. Trapovka 1/11, 4/7, 42. Liman-Zakharkina mogila 3A/30, 43. Borisovka 9/6, 44–45. Glubokoe 1/24, 1/25, 46. Artsyz 1/22, 47. Bashtanovka 4/25, 48–49. Nerushay 10/13, 10/14, 50–51. Kholmskoe 2/8, 2/13, 52. Kamenka 1/8, 53. Novokamenka 1/5, 54. Orlovka 1/9, 55. Vlădiceni I, 9/2, 56–57. Kubey 22/18, 23/16, 58. Giurgiulești 3/13, 59. Taraclia II 14/16, 60. Petrești 1/3, 61. Tîrpești/1, 62. Răcăciuni /?, 63. Râmnicelu /10, 64. Șendreni /?, 65–68. Brăilița /3, /8, /9, /33; 69. Luncavița-Drumul Vacilor 1/5, 70. Mihai Bravu 2/3, 71. Gurbănești 1/2, 72. Blejoi I/1, 73. Păulești II/2, 74–75. Ploiești-Triaj I/2, 1/3

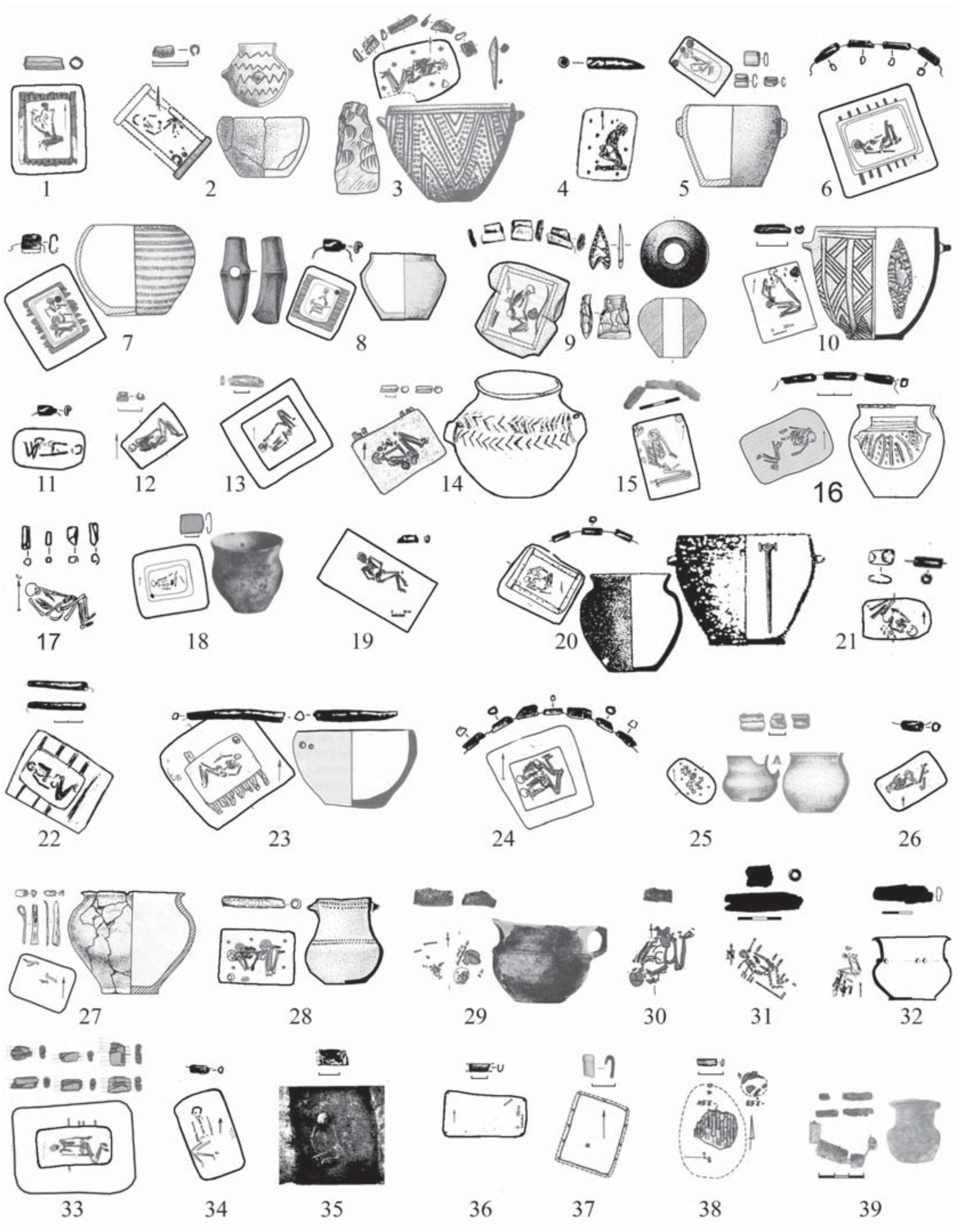


Fig. 14. Copper beads in context (1–19. on the back with an inclination on the left side, 20–31. on the back with an inclination on the right side, 32–35. supine position with raised legs, 36–37. cenotaphs, 38. ritual complex, 39. unknown position): 1. Mocra 1/6, 2. Baranovo 1/9, 3. Roşcani 1/13, 4. Tîtnauca II 2/7, 5–8. Semenovka 2/2, 8/15, 8/16, 19/9, 9. Shirokoe/Alkalia 33/3, 10. Diviziya II 6/3, 11. Nerushay 10/13, 12. Belolese 4/4, 13. Kholmskoe 2/13, 14. Kamenka 1/8, 15. Novokamenka 1/5, 16. Bashtanovka 7/1, 17. Vlădiceni 9/2, 18. Aleksandrovka 1/24, 19. Starye Biliary 1/14, 20. Limanskoe 4/4, 21. Petrodolinskoe 1/9, 22. Kholmskoe 2/8, 23. Borisovka 9/6, 24. Roşcani 5/7, 25. Kubey 23/16, 26. Giurgiuleşti 3/13, 27. Taraclia II 14/16, 28–29. Brăiliţa 1/8–9, 30. Păuleşti 2/1, 31. Blejoi I/1, 32. Slobozia I 1/15, 33. Trapovka 4/7, 34. Kubey 22/18, 35. Gurbăneşti 1/2, 36. Diviziya II 6/1, 37. Petreşti 1/3, 38. Novogrigorevka-Liubasha 2/2, 39. Şendreni ?/? (See Annex III)

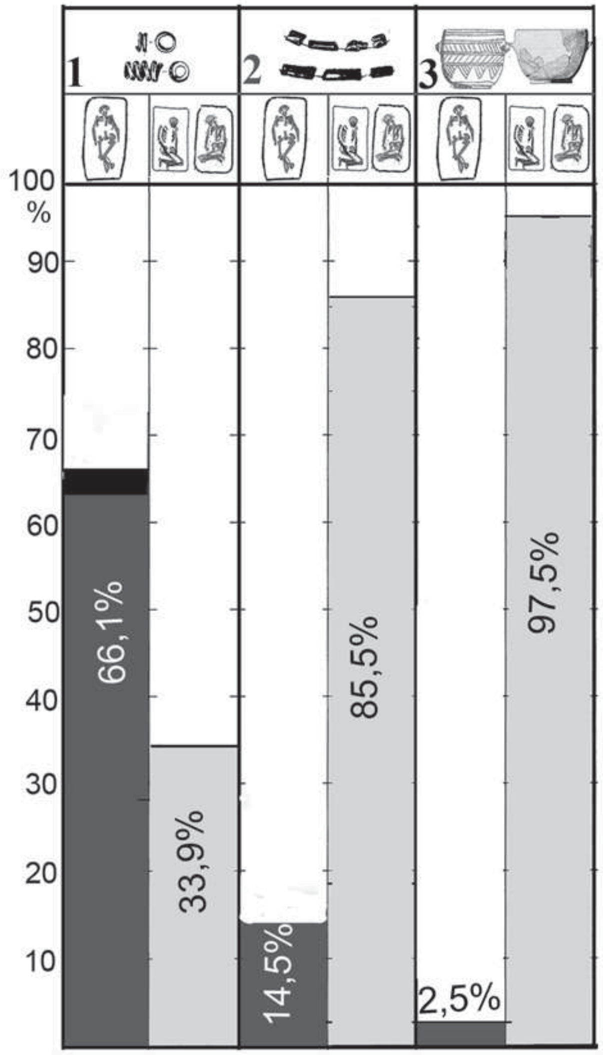
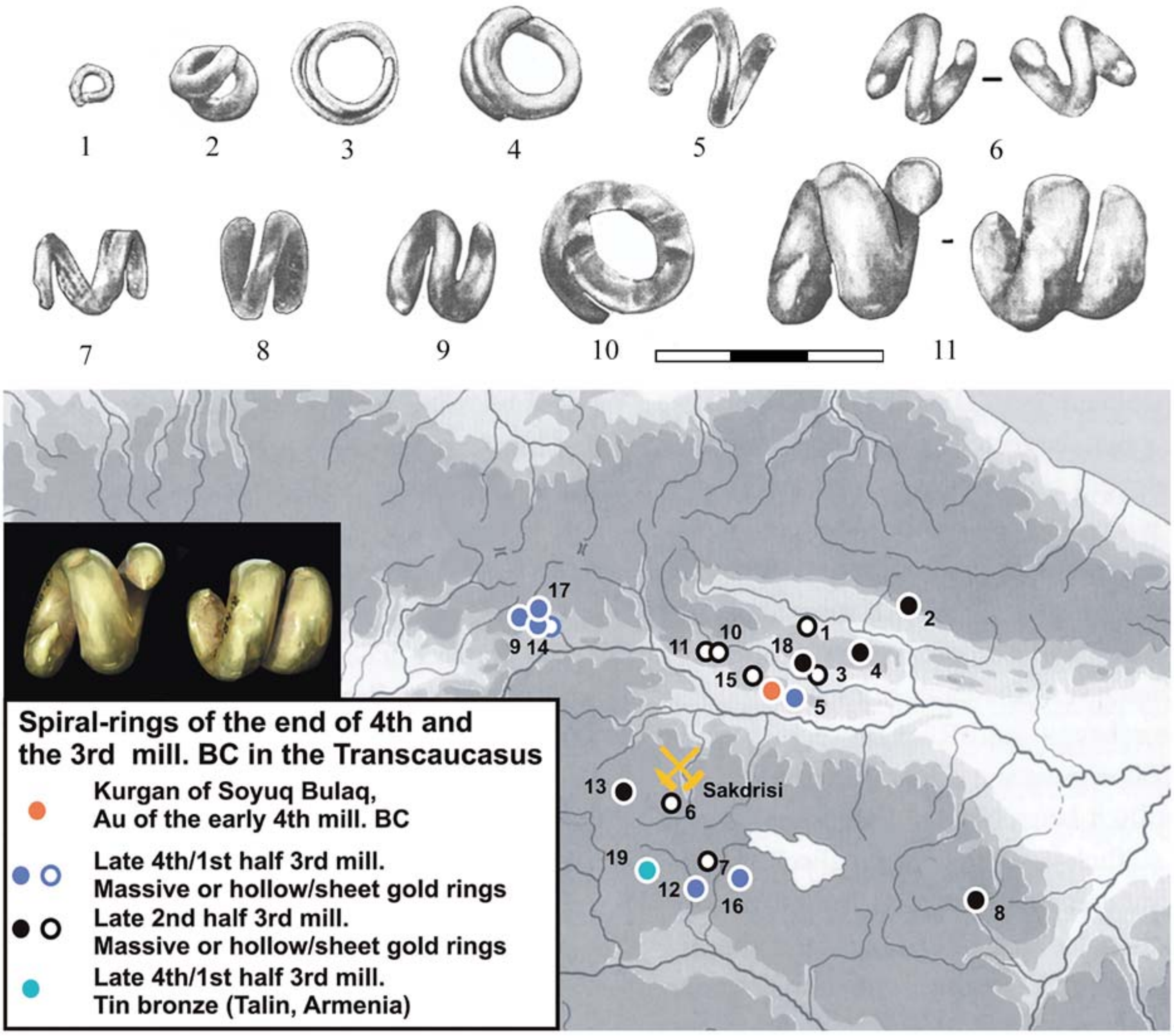


Fig. 15. Portions of burial rite types (positions) typical for the graves with temple rings (1), composed bracelets (2), and Budzhak type vessels (3)

graves. However, the latter statement requires verification because of the incomplete anthropological identifications. In rare cases, components of bracelets were found near a skull and hence might have been also used as temple rings or components of ornaments associated with the breast.

What about their spatial distribution? Unlike temple rings (*Fig. 10*), composed bracelets (with six–seven exceptions: *Fig. 13.61, 71–75*) were found in steppe burials. Their area corresponds to the territory of Budzhak type vessel finds (*Fig. 3*). Similarities between these categories of data also include correlations with other inventory and funeral rites.

Figure 14 demonstrates drawings of 39 (out of 75) complexes including copper beads and other inventory coming from burials with clearly identified positions. Comparing these data with the evidence on spiral-shaped rings, it is easy to recognise a significant difference in qualitative and quantitative characteristics of the assemblages. As mentioned above, complexes with rings include vessels in a very limited number, tools and weapons, and also parts of wagons (*Fig. 11* and *12*). Almost every second complex including copper beads is also accompanied by ceramics of various forms (*Fig. 14*). Moreover, Budzhak type vessels are among the most common pottery shapes (*Fig. 14.3, 5, 10, 14*). Weapons and


1
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Spiral-rings of the end of 4th and the 3rd mill. BC in the Transcaucasus
● Kurgan of Soyuq Bulaq, Au of the early 4th mill. BC
● ○ Late 4th/1st half 3rd mill. Massive or hollow/sheet gold rings
● ○ Late 2nd half 3rd mill. Massive or hollow/sheet gold rings
● Late 4th/1st half 3rd mill. Tin bronze (Talin, Armenia)
Sakdrisi
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Fig. 16. Gold spiral-shaped rings of the 4th–3rd millennium BC from Kura and Arak interfluve (after Stöllner *2016, 216, fig. 5.11)*

tools are also found more commonly. In the context of this study flint axes-adzes and bone arrowheads require additional discussion (*Fig. 14.3, 9*).

Differences in funeral rites between the compared groups are visible. As stated above, Budzhak type vessels mostly accompany individuals laid on the back, with an inclination on the left/right side (*Fig. 15.3*). A similar distribution is also noted for features with copper beads: in 47 cases (85.5%) these finds are associated with individuals laid on the back, with an inclination on the left (28) or right (19) side, and only in 8 cases (14.5%) they were found in burials with a supine position with the legs raised at the knees (*Fig. 15.2*).

Correlations are different for the complexes with rings. As stated above, in 76 cases (66.1%) they accompany supine burials with the legs raised at the knees and only in 39 cases (33.9%) they were found with individuals laid on the back, with an inclination on the left/right side. This distribution is represented in *Figure 15*.

Therefore, we may conclude that burials including Budzhak type vessels and copper beads represent a group that is distinct from burials with temple rings. This difference may be explained only by their

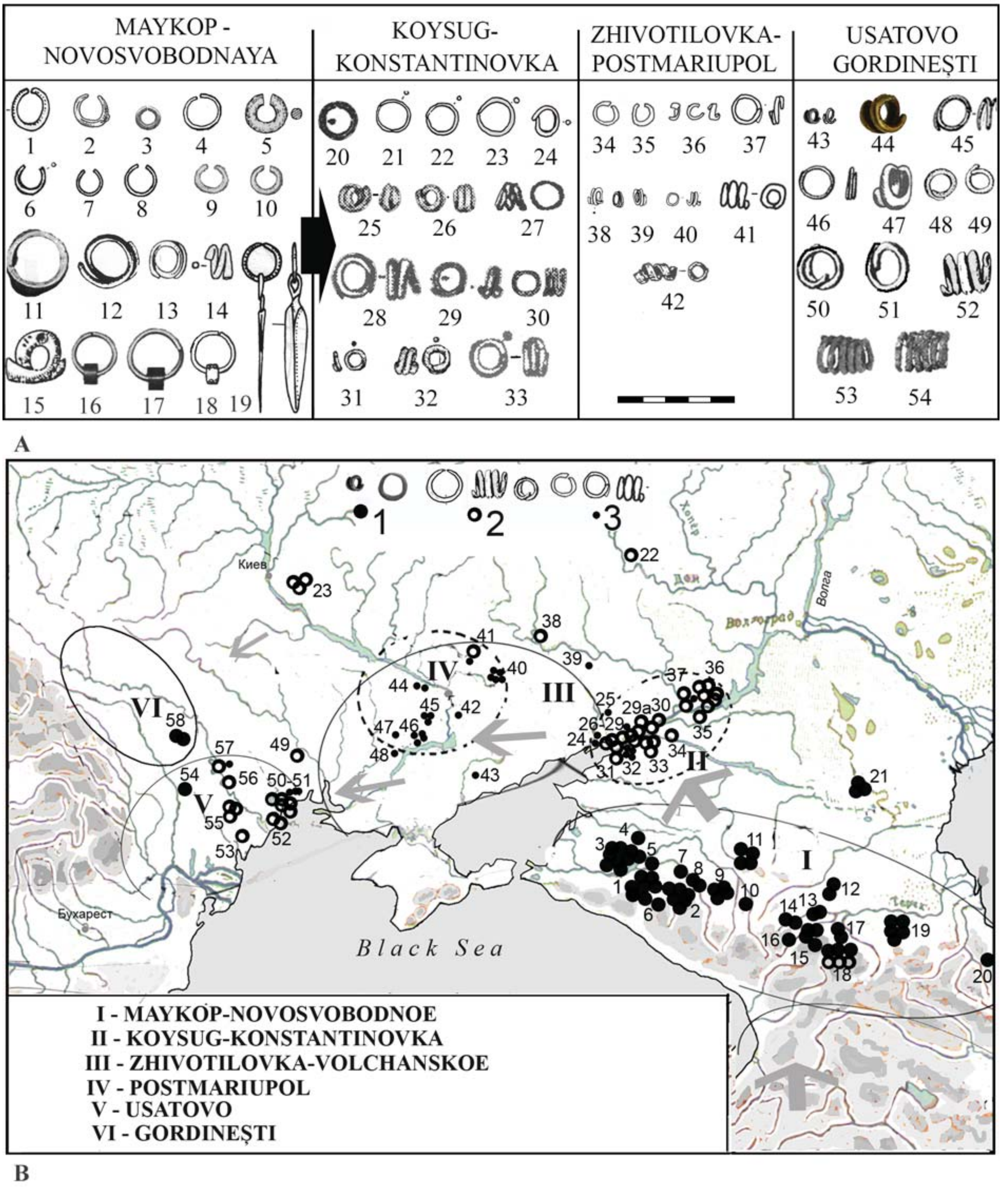

Fig. 17. A. Examples of the Maykop circle-shaped and spiral shaped rings from Caucasus (1–19) and western area (20–54): 1, 12, 19. Novosvobodnaya 1/30–31, 2. Khutor Zhukovskogo 1/; 3. Marinskaya 1/, 4, 18. Mostovskaya 3/, 5. Nalchik, 6. Kishpek 1/, 7–8. Chegem, 9–10. Bakhmut 8/, 11, 16–17. Maykop, 13. Kostromskaya 3/, 14. Velikent, 15. Bichkin-Buluk (after Munchaev 1994; Korenevskij 2004; 2011; Rezepkin 2012 and others); 20. Rostov-na-Donu-Vertoletnoe Pole 1/?, 21–23. Kostyrskiy VIII ?/3, 24. Konstantinovsk ?/2-3, 25–26. Sadovyy ?/64, 27. Novoaleksandrovka I, 28–29. Lakedemonovka 1/, 30. Nedvigovka-Tanais, 31–32. Polyakov 1/, 33. Otradnyy 3/ (after Rassamakin 2004; Fayfert 2014 and others); 34–35. Chkalovka 3/?, 36. Osokorovka, 37. Terny 9/?, 38–39. Liubimovka 3/?, 40. Solnechnyj 2/?,

41. Novopilipovka, flat cemetery - Akkerman I, 42. Ordzonikidze-Chkalovskaya 3/ (after Rassamakin *2004 and others); 43–44. Bursuceni, 45–46. Purcari 1–30 2/?, 47. Sucleia 3/?, 48–52. Usatovo, kurgan cemetery 1, 1/6, 13; kurgan cemetery 2, 2/?, 53–54. Aleksandrovka (after* Patokova *1979;* Yarovoy *1990;* Dergachev *2002 and others); B. Location of the Maykop circle-shaped and spiral-shaped rings made of gold (1), silver (2) and copper/broze-? (3): 1. Maykop, 2. Novosvobodnaya 1-2/, - Klady 2/, 28/, 30–31/, 38/, 3. Staromyshastovskiy deposit, 4. Kamenka-Dneprovskaya 2/, 5. Krasnogvardeysk 1/7, 6. Psebayskaya 1/, 7. Kostromskaya 3/, 8. Andriukovskaya, 9. Mostovskaya 3/, 10. Kubinka 4/, 11. Khutor Zhukovskogo 1/, 12. Marinskaya 1/, 13. Kishpek III 6/, 14. Kyzburun III 1/, 15. Chegem I 1, 5/, 47/; II, 2/, 16. Nezhinskiy 5/, 17. Nalchik, 18. Kudakhurt 1/, 19. Bakhmut 14–15/, 20. Velikent, 21. Bichkin-Buluk, 22. Pavlovskoe, 23. Podlesje, 24. Lakedemonovka 1/, 25. Nedvigovka-Tanais, 26. Rostov-na-Donu - Vertoletnoe Pole 1/, 27. Olimpiyskiy, 28. Nizhne-Gnilovskiy, 29. Mukhin I, 29a. Polyakov 1/, 30. Sadovyy 64/, 31. Kuleshovka, 32. Novoaleksandrovka I, 33. Alitub, 34. Otradnyy 3/, 35. Ryabichev 3/, 36. Kostyrskiy VIII 3/, 37. Konstantinovsk-Tankin 2/, 38. Zakatnoe I, 39. Zimogore 2/?, 40. Bogdanovka 1/?, 41. Terny 9/?, 42. Liubimovka 3/?, 43. Novopilipovka, flat cemetery - Akkerman I, 44. Chkalovka 3/?, 45. Solnechnyy 2/?, 46. Razumovka 1/?, 47. Ordzhonikidze-Chkalovskaya 3/?, 48. Osokorovka, 49. Kovalevka 4/?, 50–51. Usatovo, kurgan cemetery 1, kurgans 1, 6, 13; kurgan cemetery 2, kurgan 2, 52. Aleksandrovka, 53. Trapovka 10/?, 54. Sărăteni 1/?, 55. Purcari 1-2/?, 56. Sucleia 3/?, 57. Purcari 147/?, 58. Bursuceni*

relative diachronic chronological position. The Budzhak burials are later, and the burials with temple rings are earlier.

This idea is confirmed by the following arguments.

One of the main arguments is related to the origin and distribution of the temple rings. According to T. Stöllner (2016), golden rings originated in the 4th millennium BC in Transcaucasia region, where they are associated with Kura-Arak culture (*Fig. 16*). In the second half of the 4th millennium BC different variations of circle-shaped and spiral-shaped rings appear in the Maykop culture of the Northern Caucasus. Artefacts of various types or different variations were mainly made of gold (*Fig. 17.A/1–19; B.1–21*).

The spread of Maykop influences to the north caused the appearance of these ornaments in Ancient Yamnaya culture, which is confirmed by the burial near the village of Pavlovskoe, where the silver ring was found together with the axe of Maykop type (Siniuk 1983, 25, Fig. 8. 7, 10). However, the distribution of these ornaments (predominantly made of silver) is mainly associated with western areas, where they are known complexes of Koysug-Konstantinovka (*Fig. 17.A/20–33; B/24–37*), Zhivotilovka and Post-Mariupol types (*Fig. 17.A/34–42; B/38–48*), and especially Late Tripolye sites of Usatovo and Gordinești types (*Fig. 17.A/43–54; B/49–58*).

It is complicated to speculate if the Yamnaya populations reaching the Carpathian-Dniester region brought these ornaments from the steppe or they represent influences from the Usatovo group. In any case, in the analysed region these rings are one of the most archaic.

The chronological correlation between tubular beads and composed bracelets is different. Despite copper beads being well known in various cultures since the early Eneolithic (for instance, composed bracelet from Cărbuna deposit). However, such finds are very rare in all these cultures. In the Bronze Age of Eastern Europe, Budzhak type sites represent the earliest evidence for the wide character of fashion. Therefore, compared to the spiral-shaped rings, the chronological position of the copper bracelet is later.

The other argument is the stratigraphic position of complexes referred to the two groups (*Fig. 18*).

As stated above, only four (5.4%) barrows with Budzhak type vessels are the main graves. All the other graves are secondary and associated with earlier barrows (*Fig. 18.3/A–B*). A similar correlation is

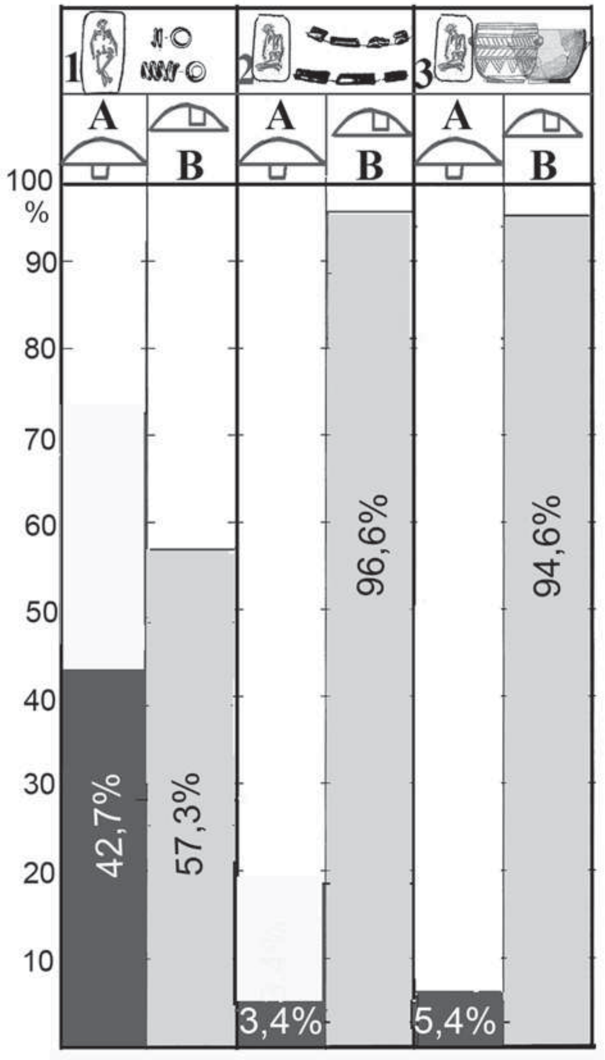

Fig. 18. Proportions of the stratigraphic position of burial types (positions) and diagnostic inventory: A – main, earliest graves, B – secondary graves

represented by complexes with copper beads, where only 3.4% are the main graves, while the others are secondary graves (*Fig. 18.2/A–B*).

The related values estimated for the complexes with spiral-shaped rings are different. Here, 42.7% are the main graves, and the other 57.3% are the secondary graves (*Fig. 18.1/A–B*).

Therefore, the chronological position of spiral-shaped rings and copper beads compared to the chronology of composed bracelets, their stratigraphic relation results in a single conclusion. Graves with spiral-shaped rings are relatively earlier, and graves with Budzhak type vessels and copper beads are relatively later.

Further analysis requires consideration of several categories and types of finds identifying the internal chronology of Yamnaya sites in the analysed region. I have listed these chronological markers 40 years ago. These are the anthropomorphic stelae, remains of wagons and a series of ceramic forms (Dergachev 1986, 75, 84, fig. 18; fig. 19). Of course, the introduction of the significant amount of new data obtained in the last decades suggests the preliminary work on its classification, which is not among the aims of this paper. Therefore, we provide the two figures representing the correlation between categories and types of finds from different graves (supine with the legs raised at the knees, and individuals laid on the back, with an inclination on the left/right side or just crouched on a side). Let us briefly comment on these figures.

Categories and types associated with the crouched on a side burials are represented in *Figure 19*. They are characterised by rich and various grave goods. The highest variability is noted for the ceramic complex, mostly including unusual (lacking in other cultures) shapes, which are represented by dozens of items. These are the cup-shaped forms, with two handles which have vertical holes (*Fig. 19.I/1–7*) or do not have holes (*Fig. 19.I/8–15*), conical (*Fig. 19.I/16–18*) and semi-spherical (*Fig. 19.I/19–23*) bowls.

Amphora-shaped vessels have attached handles with vertical holes (*Fig. 19.II/1–11*) or are characterised by high proportions and handles of different types (*Fig. 19.II/12–17*).

Specific shapes are noted for various goblet-shaped vessels (*Fig. 19.III/1–7*), "askoi" (*Fig. 19.IV/1–4*), jugs (*Fig. 19.IV/5–6*) and single-handle mug-cups (*Fig. 19.IV/7–12*).

The complex of tools and weapons, especially flint axes-adzes (*Fig. 19.V/1–4*) and bone arrowheads (*Fig. 19.V/5–7*), require additional attention.

The specific of ornaments was already discussed (*Fig. 19.VI/1–3*). Among the other categories rarely accompanying crouched on a side burial we should mention anthropomorphic stelae (*Fig. 19.VI/4–7*) and wagon parts (*Fig. 19.VI/8–9*).

The inventory accompanying supine burials with the legs raised at the knees is very much different (*Fig. 20*). Unlike the group discussed above, these graves are not characterised by their "own" forms of cup-shaped or bowl-shaped vessels. The only exception is represented by a cup of S-shaped profile, definitely imported from the outside (*Fig. 20.I/1–3*).

Amphorae with attached handles with vertical holes are rare in these graves. Most probably, they are incorporated from the group discussed above (*Fig. 20.II/1–4*). Imported vessels of Globular Amphorae culture known from Middle Prut are also rare (*Fig. 20.II/5–8*). The same observation is made for the amphorae of tall proportions (*Fig. 20.II/9–11, 14*) and spherical-body amphorae (*Fig. 20.II/12–13*), goblet-shaped vessels, "askoi" and jugs (*Fig. 20.III/1–4; Fig. 20.IV/1–2*).

These graves are accompanied by tools and weapons made of stone (axes), flint (arrowheads, knives) or copper and bronze. However, such finds are rare. They rather have a common cultural, "epoch-defining" character.

Three categories of "common Yamnaya" cultural horizon are most common for this group. These are spiral-shaped rings (*Fig. 20.V/1–3*), anthropomorphic stelae (*Fig. 20.VI/1–6*) and wagon parts (*Fig. 20.VI/7–12*) mainly concentrating in the steppe, but also known for the forest-steppe zone.

Since these groups include funeral rites as a main component, which has chronological significance, these groups represent stable correlations of quantitative and qualitative parameters. The parameters reflect two main periods of the development of the Yamnaya culture between Carpathians and Dniester, the Early (*Fig. 20*) and the Late (*Fig. 19*).

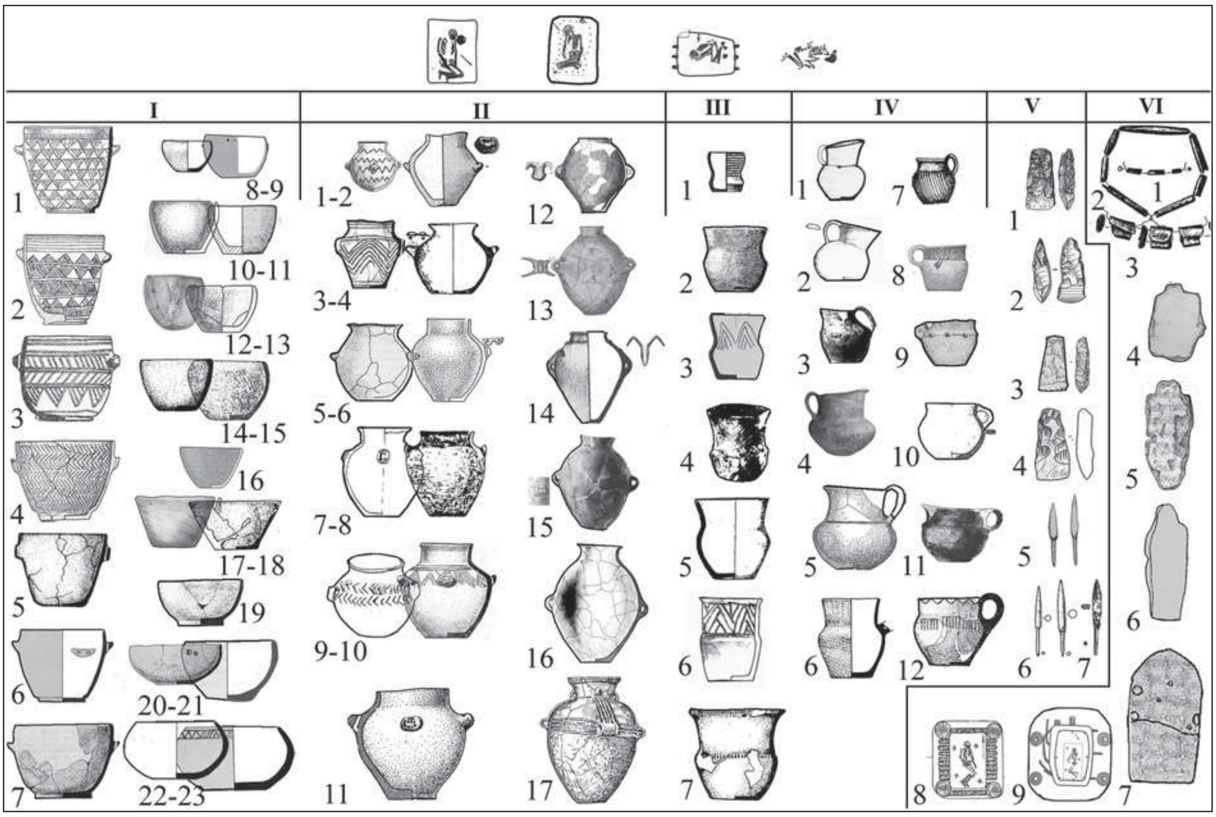

Fig. 19. Diagnostic materials of typical burials with individuals on the back with an inclination on the side representing the Late period of Yamnaya culture between Carpathians and Dniester:

I. Cup-shaped vessels and bowls: 1. Dubosari 4/4 (after Ketraru et al. 2014), 2. Semenovka 8/18 (after Subbotin – Razumov – Sinika 2017), 3. Grigorievka 1/12 (after Subbotin 1982), 4. Corjevo 8/14 (after Borziyak – Manzura – Levitskiy 1983), 5. Crasnoe 9/23 (after Serova – Yarovoy 1987), 6. Mayaki IV 1/1 (after Chernyakov et al. 1982), 7, 19. Răscăeții Noi 2/12 (after Yarovoy 1990), 8. Cazaclia 17/14 (after Sava – Agulnikov – Manzura 2019), 9. Vlădiceni 9/8 (after Gudkova et al. 1984), 10. Ciobruciu II 1/12 (after Dergachev 1973), 11. Semenovka 2/3 (after Subbotin – Razumov – Sinika 2017), 12. Mirnoe II 1/9 (after Alekseeva 1974), 13. Baranovo 1/9 (after Ivanova – Petrenko – Vetchinnikova 2005), 14. Mologa 2/25 (after Maliukevich – Agulnikov – Popovich 2017), 15. Speia 1/5 (after Dergachev – Manzura – Sava 1992), 16. Dobrianka 1/6, 17. Porogi 3A/18 (after Harat – Potupczyk – Razumov 2014), 18. Bolotești-Vrancea 2/14 (after Buzdugan – Bobi – Cernea 1987), 20. Feștelița II 1/2 (after Vysotskiy 1992), 21. Kholmskoe 2/8 (after Chernyakov – Stanko – Gudkova 1986), 22. Alkaliya 8/3 (after Subbotin et al. 1987), 23. Mikhailovka 3/12 (after Chernyakov et al. 1983);

II. Amphora-shaped vessels: 1. Baranovo 9/3 (after Ivanova – Petrenko – Vetchinnikova 2005), 2. Semenovka 2/6 (after Subbotin – Razumov – Sinika 2017), 3. Olănești 1/15 (after Yarovoy 1990), 4. Primorskoe 1/13 (after Chebotarenko – Toshchev – Chernyakov 1993), 5. Kholodnaya Balka 1/7 (after Petrenko 2010), 6. Taraclia I 1/13 (after Dergachev – Sava 2016), 7. Tatarbunary 1/2 (after Subbotin 1988), 8. Gura Bîcului 7/1 (after Dergachev 1984), 9. Kholmskoe 2/13 (after Chernyakov – Stanko – Gudkova 1986), 10. Gradeshka I 5/11 (after Subbotin – Ostroverkhov – Dzigovskiy 1995), 11 – Novoselitsa 19/13 (after Subbotin – Ostroverkhov – Dzigovskiy 1995), 12–13. Porogi 3/4, 4/8 (after Harat – Potupczyk – Razumov 2014), 14. Ocnița 6/18 (after Manzura – Klochko – Savva 1992), 15. Efimovka 10/7 (after Shmagliy – Chernyakov 1985) 16. Bursuceni 1/14 (after Yarovoy 1978), 17. Valea Lupului 1/22 (after Dinu 1957);

III. Goblet-shaped vessels: 1. Mirnoe 1/12 (after Alekseeva 1979), 2. Purcari 1/23 (after Yarovoy 1990), 3. Trapovka 4/5 (after Vanchugov – Zaginaylo – Toshchev 1976), 4. Efimovka 9/17 (after Shmagliy – Chernyakov 1985), 5. Ogorodnoe III 1/16 (after Subbotin – Zaginaylo – Shmagliy 1970), 6. Brăilița 1/34 (Harțuche 2002), 7. Bolotești-Vrancea 2/7 (after Buzdugan – Bobi – Cernea 1987);

IV. "Askos" pots, jugs, mug-cups: 1. Kubey 26/4 (after Subbotin et al. 1987), 2, 11. Brăiliţa 1/10 (after Harţuche 2002), 3. Smeeni-Movila Mare /13 (after Frînculeasa et al. 2017), 4. Gherăseni /117 (after Garvăn – Simalcsik – Frînculeasa 2018), 5. Răcăciuni (after Tudor 1973), 6. Cazaclia 17/27 (after Sava – Agulnikov – Manzura 2019), 7. Bolotești-Vrancea 2/9 (after Buzdugan – Bobi – Cernea 1987), 8. Hîrșova 1/2 (after Morintz – Şerbănescu 1974), 9. Liești-Arbănașu 1/22 (after Brudiu 2003), 10. Glinoe II 110/5 (after Razumov et al. 2013), 12. Olănești 1/28 (after Yarovoy 1990);

V. Tools and weapons: 1. Nicolscoe 11/7 (after Agulnikov – Sava 2004), 2. Semenovka 8/13 (after Subbotin – Razumov – Sinika 2017), 3. Mayaki III 9/1 (after Chernyakov et al. 1982), 4. Roșcani 1/13 (after Dergachev – Borziyak – Manzura 1989), 5. Glinoe 1/1 (after Yarovoy – Savva 1983), 6. Brăviceni 16/9 (after Larina – Manzura – Khakheu 2008), 7. Podoima 3/4 (after Bubulich – Khakheu 2002);

VI. Ornaments: 1. Glubokoe 1/24, 2. Liman 3A/30, 3. Alkaliya 33/3 (after Subbotin 2003); Anthropomorphic stelae: 4. Timkovo 1/12 (after Demchenko – Levitskiy 1999), 5. Olănești 2/1 (after Yarovoy 1990), 6. Plavni 25/1 (after Andrukh – Dobroliubskiy – Toshchev 1985), 7. Mayaki III 1/4 (Chernyakov et al. 1982); Wagons: 8. Balabanu I 13/13 (after Sava – Agulnikov – Manzura 2019), 9. Petrești 3/9 (after Yarovoy 1985)

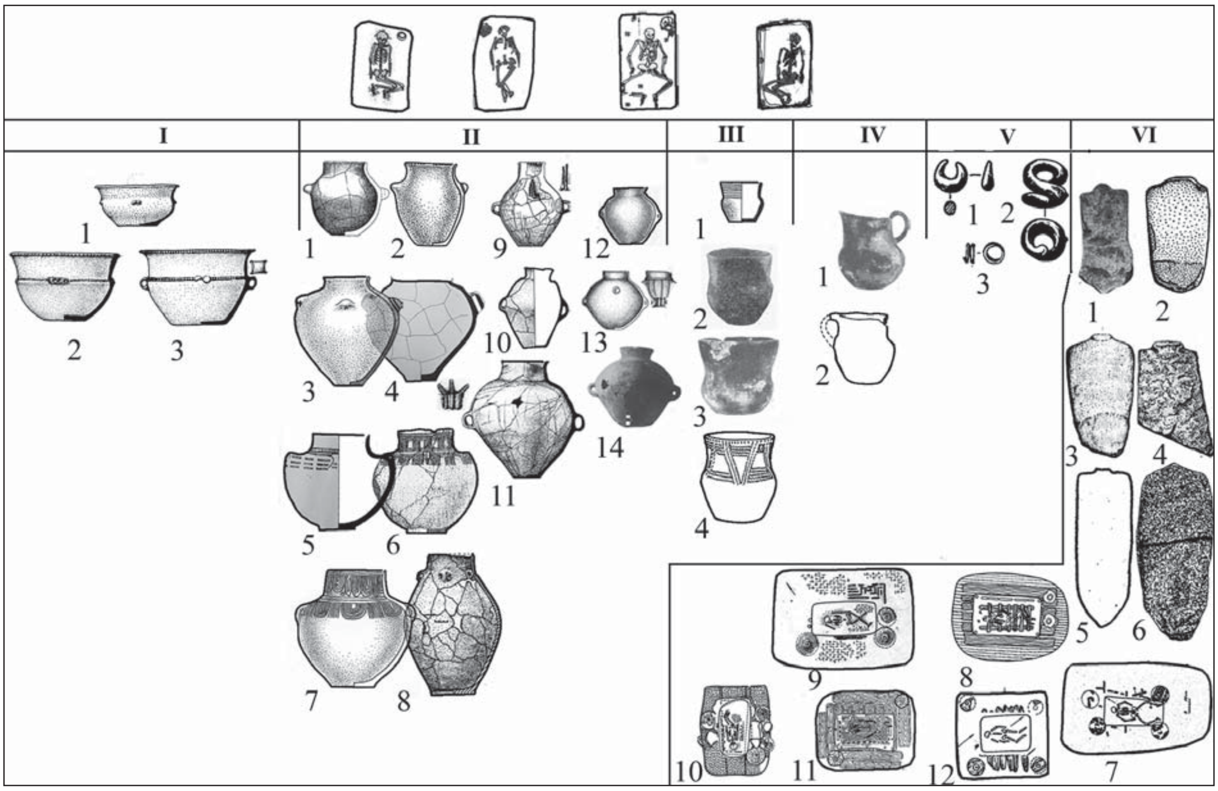

Fig. 20. Categories of data typical for supine burials with the legs raised at the knees representing the Early period of the Yamnaya culture between Carpathians and Dniester:

I. Cup-shaped vessels and bowls: 1–2. Cazaclia 15/2, 8/5, 3. Taraclia II, 14a/2 (after Sava – Agulnikov – Manzura 2019);

II. Amphora-shaped vessels: 1. Rogojeni 1/1 (after Agulnikov – Mistreanu – Popovici 2014), 2. Tudora II 1/10 (after Meliukova 1962), 3, 7. Corpaci 8/13, 8/12 (after Yarovoy 1984), 4–5. Bădragii Vechi 29/14, 25/12 (after Yarovoy – Chirkov 1987; 1989; Yarovoy – Chirkov – Bubulich 1990), 6. Ocnița 3/14 (after Manzura – Klochko – Savva 1992), 8. Mărculești 3/5 (after Levinskiy – Tentiuk 1990), 9. Tîrpești /1 (after Marinescu-Bîlcu 1964), 10. Taraclia II 10/19, 11. Cazaclia 5/13 (10–11. after Sava – Agulnikov – Manzura 2019), 12. Iablona 1/1 (after Yarovoy 1983), 13. Căușeni 1/4 (after Chebotarenko – Yarovoy – Telnov 1989), 14. Ostrovnoe 2/12 (after Alekseeva 1976);

III. Goblet-shaped vessels: 1. Butor I 9/3 (after Sinika – Razumov – Telnov 2013), 2. Belyaevka 1/32 (after Shmagliy – Chernyakov 1985), 3. Glubokoe 2/8 (after Shmagliy – Chernyakov 1970), 4. Efimovka 9/17 (after Shmagliy – Chernyakov 1985);

IV. "Askos" pots, jugs: 1. Glubokoe 2/11 (after Shmagliy – Chernyakov 1970), 2. Bolgrad 1/12 (after Subbotin – Shmagliy 1970);

V. Ornaments: 1. Plavni 26/4, 2. Brăviceni 2/7; 3. Taraclia II 10/10 (after Subbotin 2003);

VI. Anthropomorphic stelae: 1. Glubokoe 1/7 (after Shmagliy – Chernyakov 1970), 2. Novoselitsa 19/7 (after Subbotin – Ostroverkhov – Dzigovskiy 1995), 3. Tomai 1/13 (after Levitskiy 1988), 4. Căușeni 1/3 (after Chebotarenko – Yarovoy – Telnov 1989), 5. Sanzheyka 1/2 (after Alekseeva 1973), 6. Mologa 1/4 (after Maliukevich – Agulnikov – Popovich 2017);

Wagons: 7. Novoselitsa 19/16 (after Subbotin – Ostroverkhov – Dzigovskiy 1995), 8–9. Kholmskoe 2/10, 1/7 (after Chernyakov – Stanko – Gudkova 1986), 10. Taraclia II 10/18 (after Sava – Agulnikov – Manzura 2019), 11. Nicolscoe 7/33 (after Agulnikov – Sava 2004), 12. Mayaki I 5/5 (after Shmagliy – Chernyakov 1985)

Conclusions

Carpathian-Dniester regional variation would be an appropriate term characterising the taxonomic position of the analysed sites in the system of Yamnaya cultural complex as a complicated cultural unit, this conclusion somewhat disagrees with recommendations of L. S. Kleyn (2016, 6). This regional variation is differentiated from Balkan, Tisza or Southern Bug variations, as well as the other regional variations in the east.

Sites of the Carpathian-Dniester region are sub-divided into two periods. The earlier period is conditionally labelled as a *Dniester* one. The later period is labelled as *Budzhak*. These labels underline chronological difference, rather than territorial separation.

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ANNEX I

Burials of the Yamnaya culture with Budzhak vessels. The numbers in the table correspond to the numbers on the map from *Figure 3*.

Abbreviations: **L –** on the back with an inclination on the left side; **R** – on the back with an inclination on the right side; **S** – supine position with raised legs; **Di** – dismembered; **Kf** – cenotaph.

No.	**SITE**	**Dimensions of vessels**		**Position**	**Source**
Name barrow/grave		**Max. H**	**Max. D**	**RLS Di Kf**	
1	Mocra **1/3**	**170**	**190**	**R**	Shcherbakova – Kashuba 1991, Tab. VIII, 3
2	Dubăsarii Noi **4/4**	**150**	**175**	**L**	Ketraru *et al.* 2014, Fig. 40.1–2; Fig. 95.1–2
3	Dubăsarii Noi **31/7**	**150**	**170**	**L**	

No.	**SITE**	**Dimensions of vessels**		**Position**	**Source**
Name barrow/grave		**Max. H**	**Max. D**	**RLS Di Kf**	
4	Crasnoe **9/23**	**115**	**115**	**L**	Serova – Yarovoy 1987, Fig. 36.1–2, 5
5	Crasnoe **9/23**	**135**	**155**	**L**	
6	Tiraspol area	**120**	**180**	**-**	Dergachev 1973, Khiam. 4441
7	Nicolscoe **7/45**	**125**	**145**	**Di**	Agulnikov – Sava 2004, Fig. 32.3–4; Fig. 51.1–2
8	Nicolscoe **10/4**	**140**	**150**	**L**	
9	Slobozia **1/25**	**140**	**185**	**R**	Shcherbakova – Tashchi – Telnov 2008, Fig. 10.1–2
10	Grigorevka **1/12**	**152**	**165**	**L**	Subbotin 1982, Fig. 1.7–8
11	Revova **3/7**	**165**	**195**	**L**	Ivanova – Petrenko – Vetchinnikova 2005, Fig. 40.1–3
12	Velikozimenovo **1/2**	**145**	**140**	**L**	Ivanova – Petrenko – Vetchinnikova 2005, Fig. 33.1–2
13	Shcerbanka **1/10**	**107**	**117**	**L**	Beylekchi 1993, Fig. 7.1, 3
14	Starye Bilyary **1/14**	**160**	**200**	**L + R**	Petrenko 1991, Fig. 27.1–8
15	Vapnyarka **4/16**	**150**	**170**	**R**	Ivanova – Vetchinnikova 2009, Fig. 4.1–2
16	Yasski **2/5**	**145**	**150**	**L**	Alekseeva 1992, Fig. 15.12; Fig. 18.5
17	Yasski **3/6**	**72**	**74**	**R**	
18	Yasski **6/14**	**63**	**75**	**R +Di**	
19	Belyaevka **1/20**	**70**	**120**	**L**	Alekseeva 1971, Fig. 3.4
20	Belyaevka **2/10**	**105**	**115**		Petrenko 2007, Fig. 8
21	Mayaki III **2/7**	**130**	**150**	**S**	Chernyakov *et al.* 1982, Fig. 52.5–6; Chernyakov *et al.* 1983, Fig. 14.1–4; Fig. 21.1–4; Fig. 30.1–6
22	Mayaki IV **1/1**	**140**	**150**	**R**	
23	Mayaki **3/1**	**100**	**105**	**R**	
24	Mayaki **9/1**	**120**	**130**	**L**	
25	Efimovka **2/14**	**178**	**180**	**L**	Shmagliy – Chernyakov 1985, Fig. 2.1–3; Fig. 3.1; Fig. 4.4–5
26	Efimovka **3/5**	**118**	**120**	**L**	
27	Efimovka **6/6**	**110**	**125**	**R**	
28	Novaya Dolina **1/2**	**50**	**65**	**?**	Alekseeva 1979
29	Grigorăuca **1/8**	**47**	**80x130**	**L**	Agulnikov – Popovich 2009, Fig. 4.1–6
30	Brăviceni **16/9**	**133**	**175**	**L ?**	Larina – Manzura – Khakheu 2008, Fig. 40.1–5
31	Dubăsarii Vechi **1/28**	**52**	**8x142**	**L**	Borziyak – Levitskiy 1989, Fig. 4.5
32	Corjovo **1 (8)/4**	**115**	**130**	**R**	Borziyak – Levitskiy 1989, Fig. 3.1–2; Borziyak – Manzura – Levitskiy 1983, Fig. VI.3
33	Corjovo **2/13**	**135**	**142**	**R**	
34	Chirca **1/7**	**125**	**135**	**L**	Dergachev – Sava 2002, Fig. 23.2–3
35	Beriozchi **d.g.**	**78**	**102**	**-**	Dergachev 1975, Fig. 2.12
36	Roșcani **1/13**	**140**	**196**	**L**	Dergachev – Borziyak – Manzura 1989, Fig. 6.2–8
37	Gura Bîcului **3/2**	**105**	**140**	**R**	Dergachev 1984, Fig. 4.1–3; Fig.7.1–2
38	Gura Bîcului **5/13**	**102**	**135**	**L**	
39	Ursoaia **3/12**	**197**	**192**	**L**	Chebotarenko – Yarovoy – Telnov 1989, Fig. 54.1–2
40	Cîrnățeni **6/9**	**140**	**150**	**L**	Demchenko – Levitskiy 1997, Fig. 10.5, 9
41	Talmaza **3/15**	**85**	**140**	**S**	Agulnikov – Antipenko 1990, Fig. 22.8, 13
42	Ciobruci **4/10**	**115**	**160**	**L**	Agulnikov – Antipenko 1990, Fig. 9.2, 7
43	Răscăeții Noi **2/12**	**130**	**175**	**R**	Yarovoy 1990, Fig. 5.1–3

No.	**SITE**	**Dimensions of vessels**		**Position**	**Source**
Name barrow/grave		**Max. H**	**Max. D**	**RLS Di Kf**	
44	Popeasca **1/9**	**110**	**115**	**R**	Vysotskiy 1992, Fig. 6.1, 4
45	Purcari **1/23**	**125**	**125**	**R**	Yarovoy 1990, Fig. 31.3, 7–8
46	Olănești **1/26**	**45**	**60**	**R**	Yarovoy 1990, Fig. 65.1–4; Fig. 78.2; Fig. 87.2–3
47	Olănești **1/26**	**-160?**	**-170?**	**R**	
48	Olănești **6/4**	**130**	**180**	**Kf**	
49	Olănești **13/2**	**70**	**92**	**R**	
50	Căplani **1/15**	**105**	**125**	**R**	Agulnikov 1984, Fig. 3.5, 10
51	Semenovka **2/2**	**120**	**152**	**L**	Subbotin – Razumov – Sinika 2017, Fig. 9.8–12; Fig. 23.1–2; Fig. 36.1–2; Fig. 46.4–5; Fig. 54.3–5
52	Semenovka **8/18**	**164**	**152**	**L**	
53	Semenovka **12/2**	**175**	**194**	**L**	
54	Semenovka **14/21**	**137**	**175**	**R**	
55	Semenovka **19/4**	**160**	**182**	**L ?**	
56	Sadovoe **1/14**	**110**	**110**	**L**	Maliukevich – Agulnikov – Popovich 2017, Fig. 6.7–8; Fig. 7.4–6
57	Sadovoe **1/18**	**120**	**145**	**L**	
58	Polevoe **1/5**	**?**	**?**	**?**	Chernyakov *et al.* 1983, Fig. 5.1–4; Fig. 6.1–2
59	Polevoe **1/8**	**98**	**140**	**L + R**	
59a	Polevoe **2/6**	**60**	**80**	**L + R**	
60	Shirokoe **5/3**	**100**	**110**	**R**	Subbotin *et al.* 1987, Fig. 57.4–7; Fig. 58.1–8
61	Shirokoe **5/6**	**175**	**225**	**L**	
62	Diviziya 2 **6/3**	**175**	**192**	**L**	Subbotin – Sapozhnikov – Subbotin 2002, Fig. 7.3–6
63	Zheltyy Yar **3/12**	**85**	**100**	**?**	Subbotin *et al.* 1981, Tab. 19, 7–11
64	Zarya-Mikhailovka **3/6**	**90**	**90**	**L**	Chernyakov *et al.* 1982, Fig. 21.1–4
65	Zarya-Mikhailovka **3/8**	**160**	**170**	**Kf**	Chernyakov *et al.* 1982, Fig. 23.3–4
66	Zarya-Mikhailovka **3/12**	**180**	**200**	**L**	Chernyakov *et al.* 1982, Fig. 27.1–5
67–	Trapovka **1/8**	**110**	**134**	**Di**	Subbotin – Ostroverkhov – Dzigovskiy 1995, Fig. 4.6–11
68	Trapovka **1/8**	**96**	**140**	**Di**	
69	Vishnevoe **17/31**	**95**	**110**	**R**	Dvoryaninov – Dzigovskiy – Subbotin 1985, Fig. 9.1–2; Fig. 9.6–7
70	Vishnevoe **17/36**	**110**	**145**	**L**	
71	Novoselitsa **19/19**	**100**	**130**	**L**	Subbotin – Ostroverkhov – Dzigovskiy 1995, Fig. 29.5–6
72	Bashtanovka **4/25**	**162**	**175**	**L**	Shmagliy – Chernyakov 1970, Fig. 60.4
73	Glubokoe **1/25**	**178**	**185**	**L**	Shmagliy – Chernyakov 1970, Fig. 38.2
74	Strumok **5/6**	**120**	**160**	**L**	Gudkova *et al.* 1979, Tab. XVI, 5–6
75	Nerushay **9/56**	**75**	**84**	**L**	Shmagliy – Chernyakov 1970, Fig. 15.1, 5
76	Nerushay **9/74**	**78**	**10**	**L + R**	
77	Primorskoe **1/34**	**115**	**160**	**L**	Chebotarenko – Toshchev – Chernyakov 1993, Fig. 4.8–9
78	Chervonnyy Yar **1/2**	**143**	**145**	**?**	Alekseeva 1974, Fig. 27
79	Kholmskoe **1/4**	**115**	**145**	**R+ R**	Chernyakov – Stanko – Gudkova 1986, Fig. 3.1
80	Kislitsa **8/16**	**115**	**105**	**R**	Gudkova – Toshchev – Chebotarenko 1995, Fig. 8.6–7
81	Novokamenka **1/5**	**70**	**90**	**L**	Shmagliy – Chernyakov – Alekseeva 1971; Alekseeva 1992, Fig. 19.1–3
82	Novokamenka 1 mound	**155**	**180**	**-**	
83	Plavni **9/12**	**180**	**210**	**L**	Andrukh – Dobroliubskiy – Toshchev 1985, Fig. 17.3; Fig. 18.1
84	Plavni **15/5**	**115**	**125**	**R**	

No.	**SITE**	**Dimensions of vessels**		**Position**	**Source**
Name barrow/grave		**Max. H**	**Max. D**	**RLS Di Kf**	
85	Nagornoe **14/15**	**155**	**160**	**L**	Toshchev 1992, Fig. 4.8
86	Frikatsey **10/14**	**160**	**175**	**L**	Gudkova *et al.* 1981, Tab. L, 5–6
87	Etulia II **1/6**	**73**	**101**	**L**	Borziyak 1984, Fig. 6
88	Giurgiulești **2/14**	**105**	**135**	**?**	Khakheu – Popovich 2019, Fig. 3.7
89	Balabanu **13/10**	**?**	**?**	**?**	Chebotarenko – Yarovoy – Telnov 1989, Fig. 24.4, 6
90	Svetlîi **3/10**	**140**	**180**	**?**	Manzura 1984, Fig. 6.4
91	Sărăteni **3/13**	**110**	**130**	**R**	Levițki – Manzura – Demchenko 1996, Fig. 29.1–2; Fig. 50.2–3
92	Sărăteni **6/4**	**122**	**160**	**L**	
93	Vlădești T.216 **1/2**	**170**	**175**	**L**	Brudiu 2003, Fig. 32.1
94	Murighiol **4/6**	**106**	**116**	**?**	Simion 2003, Fig. 4.3
Total 94 cases				**L-51, R-30, S-2, Di-4, Kf-2, ?-7**	

ANNEX II

Burials of the Yamnaya culture with temple spiral rings. The numbers in the table corresponds to the numbers on the map from *Figure 10*.
Abbreviations: Position: **L –** on the back with an inclination on the left side; R – on the back with an inclination on the right side; **S** – supine position with raised legs; **Ce** – primary; **Se** – secondary.

No.	**SITE**	**Types**		**Position**		**Source**
Name barrow/grave		**Spiral-shaped**	**Bagel-shaped**	**S R L**	**Ce Se**	
		Au Ag Cu				
1	Pisarivka **5/1**	**1Ag**	**1Ag**	**S**	**Ce**	Harat – Potupczyk – Razumov 2014, Fig. 2.I–II
2	Cuzmin **3/2**	**1Ag**	**-**	**S**	**Se**	Bubulich – Khakheu 2002, Fig. 12.C
3	Crasnoe **2/5**	**2Ag**	**-**	**S**	**Se**	Serova – Yarovoy 1987, Fig. 7.2–3; Fig. 34.2–3
4	Crasnoe **9/19**	**2Ag**		**S**	**Se**	
5	Blizhniy Khutor **3/1**	**1Ag 1Cu**	**-**	**S**	**Ce**	Sinika *et al.* 2015, Fig. 8.3–6
6	Tiraspol II **3/18**	**2Ag**	**-**	**S**	**Se**	Sava 1988, Fig. 6.1, 6
7	Nicolscoe **1/11**	**1Ag**	**-**	**R**	**Se**	Agulnikov – Sava 2004, Fig. 5.5, 8
8	Ciobruci II **1/11**	**2Cu**	**-**	**S**	**Se**	Dergachev 1973, Fig. 13.11
9	Glinoe Sad **1/4**	**1Ag**	**-**	**S**	**Se**	Telnov *et al.* 2013, Fig. 45.1–3
10	Katorzhino **1/11**	**1Ag**	**-**	**S**	**Se/Ce**	Ivanova – Petrenko – Vetchinnikova 2005, Fig. 24.1–2
11	Baranovo-*Soldatskaya Slava* **1/10**	**2Ag**	**-**	**S**	**Se/Ce**	Ivanova – Petrenko – Vetchinnikova 2005, Fig. 15.1–2
12	Yasski **1/18**	**2Ag**	**-**	**S**	**Se**	Subbotin 2003, Tab. 45, 29–30; Tab.46, 11; Alekseeva 1976, Tab. 37, 4
13	Yasski **5/22**	**2Ag**	**-**	**S**	**Se**	
14	Nikolaevka/ Efimovka **10/10**	**1Cu**	**-**	**S**		Subbotin 2003, Tab. 44, 6

No.	SITE	Types		Position		Source
	Name barrow/grave	Spiral-shaped	Bagel-shaped	S R L	Ce Se	
		Au Ag Cu				
15	Dobroaleksandrovka **1/5**	1Ag	-	S	Ce	Subbotin 2003, Tab. 45, 9
16	Odessa *Slobodka-Romanovka* **1/15**	2Ag	-	S	Se	Dobrovolskiy 1915, 133
17	Sanzheyka **1/8**	1Ag	-	S	Se	Alekseeva 1973, OAM №87480
18	Karolino-Bugaz **1/1**	2Ag	-	L	Se	Zaginaylo – Chernyakov – Petrenko 1987, Fig. 1.1, 12–13
19	Mărculeşti **3/10**	1Cu	-	S	Ce	Beylekchi 1992, Fig. 3.5–6
20	Bursuceni **1/12**	2Cu?	-	S	Se	Yarovoy 1978, Fig. 18
21	Brînzenii Noi **1/2**	2(?)Cu	-	R	Se	Agulnikov – Mistreanu 2014, Fig. 5
22	Ciocîlteni **5/6**	1Ag	-	S	Ce	Ketraru – Khakheu 1990, 69, no illustrations
23	Brăviceni **1/14**	1Ag	-	S	Ce	Larina – Manzura – Khakheu 2008, Fig. 5.2; Fig. 9.3–4; Fig. 13.1; Fig. 19.3–5
24	Brăviceni **2/8**	1Cu	-	R	Se	
25	Brăviceni **4/4**	1Au	-	?	Ce	
26	Brăviceni **7/2**	1Ag	1Ag	S	Ce	
27	Orhei **1/2**	-	1Ag	R	Se	Dergachev 1973, Fig. 2.2
28	Orhei **1/6**	1Ag	-	S	Se	
29	Roşcani **1/19**	-	2Ag	S	Ce	Dergachev – Borziyak – Manzura 1989, Fig. 6.7–13; Fig. 7.3–4
30	Roşcani **2/3**	1Cu	-	?	Se	
31	Gura Bîcului **3/13**	1Cu	-	S	Se	Dergachev 1984, Fig. 4.8–13; Fig. 6.7–9; Fig. 8.1–4
32	Gura Bîcului **5/3**	1Cu	-	?	Se	
33	Gura Bîcului **7/1**	1Cu	-	R	Se	
34	Hagimus **2/7**	1Ag	-	S	Se	Chebotarenko – Yarovoy – Telnov 1989, Fig. 70.3, 8
35	Căuşeni II **1/10**	-	1Ag	R	Ce	Chebotarenko – Yarovoy – Telnov 1989, Fig. 35.3–5; Fig. 36.1–2
36	Căuşeni II **1/13**	2Ag	-	S	Se	
37	Talmaza I **1/6**	1Ag	-	S	Ce	Agulnikov – Antipenco 1990, Fig. 16.1–3; Fig. 20.7–8
38	Talmaza I **3/4**	2Ag	-	R	Se	
39	Purcari **1/31**	3Ag	-	L	Se	Yarovoy 1990, Fig. 35.1–2
40	Olăneşti **1/16**	1Ag	-	S	Se	Yarovoy 1990, Fig. 63.5–6; Fig. 79.2, 4
41	Olăneşti **6/8**	1Ag	-	R	Ce	
42	Semenovka **11/5**	2Ag	-	S	Se	Subbotin 2003, Tab. 44, 15–17; Subbotin – Razumov – Sinika 2017, Fig. 32.2–3
43	Sadovoe **1/26**	2Ag	-	S	Ce	Maliukevich – Agulnikov – Popovich 2017, Fig. 8.3–6; Fig. 14.1–4
44	Sadovoe **1/32**	2Ag	-	S	Ce	
45	Shirokoe **33/7**	2Ag	-	?	?	Subbotin 2003, Tab. 46, 21–24
46	Shirokoe **33/9**	2Ag	-	?	?	
47	Diviziya II **5/8**	1Cu	-	S	Se	Subbotin 2003, Tab. 43, 22
48	Belolese **7/4**	5Ag	-	L	Se	Subbotin 2003, Tab. 46, 1–5; Subbotin – Dzigovskiy – Ostroverkhov 1998, Fig. 35.1–9
49	Novoselitsa **19/11**	2Ag	-	S	Se	Subbotin 2003, Tab. 45, 10–12
50	Novoselitsa **21/1**	1Ag	-	S	Se	
51	Trapovka 1974 **16/9**	1Cu	-	L	Se	Subbotin 2003, Tab. 44, 9
52	Liman-Zakhar. Mog. **3A/52**	1Cu	-	S	Se	Subbotin 2003, Tab. 43, 17–18; Tab. 44, 11
53	Liman **7/3**	-	2Ag	R	Ce	

No.	**SITE**	**Types**		**Position**		**Source**
Name barrow/grave		**Spiral-shaped**	**Bagel-shaped**	**S R L**	**Ce Se**	
		Au Ag Cu				
54	Glubokoe **1/7**	**1Au**	**-**	**S**	**Se**	Shmagliy – Chernyakov 1970, Fig. 8.3–6; Fig. 64.15
55	Glubokoe **1/26**	**1Ag**		**S**	**Se**	
56	Nerushay **1/14**	**1Ag**	**-**	**S**	**Ce**	Shmagliy – Chernyakov 1970, Fig. 8.2
57	Primorskoe **1/32**	**2Cu**	**-**	**R**	**Se**	Chebotarenko – Toshchev – Chernyakov 1993, Fig. 4.5
58	Parapory **1/20**	**2Ag**	**-**	**S**	**Se**	Subbotin 2003, Tab. 46, 12
59	Shevchenkovo **3/6**	**2Ag**	**-**	**S**	**Se**	Subbotin 2003, Tab. 46, 14
60	Kholmskoe **2/37**	**2Ag**	**-**	**S**	**Ce**	Chernyakov – Stanko – Gudkova 1986, Fig. 9.10–11; Subbotin 2003, Tab. 44, 8; Tab. 46, 6
61	Kholmskoe **8/6**	**1Cu**	**-**	**?**	**Se**	
62	Ostrovnoe **2/6**	**2Ag**	**-**	**S**	**Ce**	Subbotin 2003, Tab. 45, 5–8
63	Ostrovnoe **2/7**	**2Ag**	**-**	**S**	**Ce**	
64	Utkonosovka **6/1**	**3Ag**	**-**	**S**	**Se**	Subbotin 2003, Tab. 45, 20–22
65	Bogatoe **2/11**	**1Ag**	**-**	**S**	**Se**	Subbotin 2003, Tab. 44, 12
66	Plavni **8/31**	**1Ag**	**-**	**S**	**Se**	Subbotin 2003, Tab. 46, 29, 32
67	Plavni **25/1**	**1Cu**	**-**	**L**	**Ce**	
68	Plavni **26/7**	**1Au**	**-**	**L?**	**Se**	
69	Mrestnota Mogila **2/7**	**2Cu**	**-**	**L**	**Se**	Gudkova *et al.* 1984, Fig. 41.6–7
70	Kurchi **20/16**	**2Cu**	**-**	**?**	**?**	Subbotin 2003, Tab. 46.15–16
71	Ogorodnoe III **1/6**	**2Cu**	**-**	**?**	**?**	Subbotin 2003, Tab. 46.27–28
72	Giurgiulești **2/9**	**3Ag**	**-**	**S**	**Ce**	Khakheu – Popovich 2019, Fig. 4.16; Fig. 11.3–4
73	Giurgiulești **3/8**	**1Ag**	**-**	**R**	**Ce**	
74	Giurgiulești **5/5**	**1Au**	**-**	**S**	**Ce**	Ciobanu *et al.* 2019, 119
75	Găvănoasa **4/3**	**1Ag**	**-**	**S**	**Ce**	Agulnikov 1992, Fig. 10.1–2
76	Crihana Veche **9/17**	**2Ag**	**-**	**S**	**Se**	Ciobanu – Agulnicov 2016, Fig. 23.1–2
77	Taraclia II **3/7**	**1Cu**	**-**	**R**	**Se**	Sava – Agulnikov – Manzura 2019, Fig. 11.3–4; Fig. 27.2; Fig. 32.3–5; Fig. 48.2–6; Subbotin 2003, Tab. 44, 7
78	Taraclia II **10/10**	**1Ag**	**-**	**S**	**Se**	
79	Taraclia II **10/19**	**2Ag**	**-**	**S**	**Se**	
80	Taraclia II **14/3**	**1Au** **1Ag**	**-**	**S**	**Se**	
81	Taraclia II **18/10**	**1Ag** **1Cu**	**-**	**S**	**Se**	
82	Balabanu I **13/12**	**1Ag**	**-**	**S**	**Se**	Chebotarenko – Yarovoy – Telnov 1989, Fig. 24.5; Fig. 25.3, 5
83	Balabanu I **13/15**	**2Cu**	**-**	**R**	**Ce**	
84	Balabanu II **2/1**	**1Ag**	**-**	**S**	**Ce**	Sava – Agulnikov – Manzura 2019, Fig. 67.2, 4
85	Cazaclia **17/3**	**1Ag**	**-**	**?**	**Se**	Subbotin 2003, Tab. 44, 19; Sava – Agulnikov – Manzura 2019, Fig. 120.5–6
86	Cazaclia **23/10**	**1Ag**	**-**	**S**	**Ce**	
87	Petrești II **1/8**	**1Ag**	**-**	**S**	**Ce**	Yarovoy 1987, Fig. 7.1–2
88	Iablona **1/17**	**2Ag**	**-**	**S**	**Ce**	Yarovoy 1983, Fig.V.6
89	Duruitoarea Nouă **5/5**	**1Cu**	**-**	**S**	**Ce**	Demchenko 2007, Fig. 6.5, 8
90	Cuconeștii Vechi-Dumeni **9/21**	**1?**	**-**	**S**	**?**	Ketraru *et al.* 1975; Nikolaeva – Safronov 1976
91	Cuconeștii Vechi-Dumeni **12/4**	**1?**	**-**	**R**	**?**	

No.	**SITE**	**Types**		**Position**		**Source**
Name barrow/grave		**Spiral-shaped**	**Bagel-shaped**	**S R L**	**Ce Se**	
		Au Ag Cu				
92	Corpaci **8/12**	**1Ag**	**1Ag**	**S**	**Ce**	Yarovoy 1984, Fig. 12.3
93	Bădragii Vechi **6/7**	**2Ag**	**-**	**S?**	**Ce**	Yarovoy – Chirkov 1987, Fig. 20.3–4; Chirkov 1989, Fig. 19.4–5
94	Bădragii Vechi **25/12**	**2Ag**	**-**	**S**	**Se**	
95	Tețcani II, **1/10**	**1Ag**	**-**	**?**	**Ce**	Yarovoy 2010, Fig. 3, Tab. 6, 4–5
96	Broșteni **1/1**	**1Ag**	**-**	**L**	**?**	Petrescu-Dîmbovița 1950; Zaharia 1959, Fig. 4.1
97	Glăvăneștii Vechi (1949) **I/10**	**1Cu**	**-**	**L**	**Ce**	Comşa 1987, Fig. 11.2–3, Fig. 12.3; Comşa 1989, Fig. 8.1–4
98	Glăvăneștii Vechi (1949) **I/12**	**-**	**1Cu**	**L**	**Se**	
99	Glăvăneștii Vechi (1949) **II/3**	**2Cu+ Ag**	**-**	**L**	**Se**	
100	Ivănești ?	**2Cu+**	**-**	**?**	**?**	Coman 1980, 161
101	Vlădești **243/2**	**1Au**	**-**	**?**	**Se**	Brudiu 2003, Fig. 32.4
102	Vânători **222/13**	**1Ag**	**-**	**S**	**Ce**	Brudiu 2003, Fig. 18.2
103	Chilia Veche **1/89**	**1Ag**	**-**	**S**	**Se**	Vasiliu 1995a, Pl. IV, 5; Pl. VI, 3
104	Mihai Bravu **1/3**	**1?**	**-**	**S**	**Se**	Vasiliu 1995b, Pl. VI, 4–5
105	Mihai Bravu **1/4**	**-**	**1Ag**	**S**	**Ce**	
106	Sabangia **3/2**	**1Ag**	**-**	**S**	**Ce**	Simion 2003, 46, Fig. 6.m. 2
107	Zebil-*Movila Sărată*		**2Ag**	**?**	**?**	Frînculeasa *et al.* 2019, Anexa II, 63–64
108	Enisala	**-**	**2Ag**	**?**	**?**	Frînculeasa *et al.* 2019, Anexa II 28–29
109	Rahman **1/2**	**1Ag**	**-**	**S**	**Se**	Ailincăi *et al.* 2014, Fig. 5; Ailincăi *et al.* 2016, Fig. 10
110	Rahman **2/3**	**2Cu**	**-**	**R**	**Se**	
111	Sultana-*Movila Mare* **1/1**	**2Cu**	**-**	**-**	**-**	Şerbănescu – Comşa 2012, 24–25
112	Sultana-*Movila Mare* **1/5**	**2Cu**	**-**	**-**	**-**	
113	Gurbănești **I/2**	**-**	**1Cu**	**S**	**Se**	Rosetti 1959, Fig. 15.1–3
114	Gurbănești **II/7**	**1Cu**	**-**	**R**	**Se**	
115	Gurbănești **II/9**	**1Cu**	**-**	**R**	**Se**	
116	Gurbănești **II/12**	**1Ag**	**-**	**R**	**Se**	
117	Blejoi **III/1**	**1Cu+ Ag**	**-**	**R**	**Ce**	Frînculeasa *et al.* 2019, Pl. X.1–4; Frînculeasa *et al.* 2019, Pl. VI.1–6; Pl.VII.1–4; Frînculeasa 2020, Pl. 11.1–8
118	Blejoi **III/3**	**?**	**-**	**-**	**-**	
119	Blejoi **IV/1**	**4Ag**	**-**	**L**	**Se**	
120	Ariceștii-Rahtivani **I/1**	**1Ag+ Au**	**-**	**S**	**Se ?**	Frînculeasa 2007, Pl. 3.3; Pl. 4.4–5; Frînculeasa *et al.* 2013, Pl. 3.2–3; Frînculeasa *et al.* 2014, Pl. 6.4; Pl. 9.3; Pl. 10.3; Frînculeasa *et al.* 2019, Anexa II, 3–14
121	Ariceștii-Rahtivani **I/3**	**-**	**2Ag**	**S**	**Ce ?**	
122	Ariceștii-Rahtivani **IV/4A**	**5Ag**	**-**	**?**	**?**	
123	Ariceștii-Rahtivani **IV/5B**	**1Ag**	**-**	**R**	**Ce**	
124	Ariceștii-Rahtivani **VII/2**	**2Ag**	**-**	**?**	**?**	
125	Ploiești-Triaj **1/3**	**1Ag**	**-**	**?**	**?**	Frînculeasa *et al.* 2019, Anexa II, 47–49, Pl. XII.m.15, m.20
126	Ploiești-Triaj **II/15**	**1Ag**	**-**	**L**	**?**	
127	Ploiești-Triaj **II/20**	**1Ag**	**-**	**L**	**?**	
128	Verbița **2/?**	**1Ag**	**-**	**S**	**?**	Berciu – Roman 1984, Fig. 1.3
129	Plenița-*Măgura Mare* **/1**	**2Ag**	**-**	**S**	**Ce**	Berciu 1952, Fig. 21

No.	SITE	Types		Position		Source
Name barrow/grave		Spiral-shaped	Bagel-shaped	S R L	Ce Se	
		Au Ag Cu				
130	Zimnicea c.g. **4**	1Ag		R	-	Alexandrescu 1974, Pl. 8.1–7, 10–14; Pl. 9.1–2
131	Zimnicea c.g. **9**		5Ag	R	-	
132	Zimnicea c.g. **11**	2Ag		R	-	
133	Zimnicea c.g. **16**	1Ag	-	R	-	
134	Zimnicea c.g. **20**	3Ag	-	R	-	
135	Zimnicea c.g. **24**	2Ag	-	L	-	
Total 135 complexes		Au-7 Ag-136 Cu-46 ?-4	Ag-19 Cu-2	S-76 R-25 L-14	Ce 44 Se 67	
		189+4	21			
		197+21=216				

ANNEX III

Burials of the Yamnaya culture with bracelets composed from thin copper plates. The numbers correspond to the numbers on the map from *Figure 13*.
Abbreviations: Position: **L –** on the back with an inclination on the left side; **R** – on the back with an inclination on the right side; **S** – supine position with raised legs; **Ce** – primary; **Se** – secondary; Place: **L** – left hand; **R** – right hand; **Ot** – other.

No.	SITE	Ex.	Position		Place	Source
Name barrow/grave			R L S	Ce-Centr. Se-Second	R L Ot	
1	Mocra **1/6**	1	L	Se	L	Shcherbakova – Kashuba 1991, Tab. VIII, 1; Subbotin 2003, Tab. 47, 20
2	Târnauca **II 2/17**	1	L	Se	L	Agulnikov – Sava 2004, Fig. 99.2–3
3	Nicolscoe **7/7**	1	R	Se	R	Agulnikov – Sava 2004, 54
4	Slobozeia **1/21**	3	L	Se	Ot	Shcherbakova – Tashchi – Telnov 2008, 29; Subbotin 2003, Tab. 47, 12–14
5	Slobozeia **4/4**	2	?	?	?	
6	Slobozeia **4/5**	2	?	?	?	
7	Grigorevka **1/12**	2+	L	Ce	R	Subbotin 1982, 104
8	Novogrigorevka - Liubasha **2/2**	3	?	Se	?	Ivanova – Petrenko – Vetchinnikova 2005, Fig. 50.3–5
9	Katarzhino **1/1**	2	R ?	Se	R	Ivanova – Petrenko – Vetchinnikova 2005, 31, 41
10	Katarzhino **1/21**	+?	S	Se	Ot	
11	Baranovo **1/9**	1	L	Se	R	Ivanova – Petrenko – Vetchinnikova 2005, 23, Fig. 14.1–9, 14; Subbotin 2003, Tab. 48, 22
12	Shcherbanka **1/7**	1	R	Se	R	Beylekchi 1993, 63–64
13	Limanskoe **4/4**	2	R	Ce	R?	Ivanova – Vetchinnikova 1993, Fig. 2.5–6
14	Starye Bilyary **1/14**	3	L	Se	?	Petrenko 1991; Subbotin 2003, Tab. 48, 4–6
15	Vapnyarka **4/16**	+	R	Se	L	Ivanova – Vetchinnova 2009, 47, Fig. 4.1–2
16	Kholodnaya Balka **1/15**	+	?	Se	R	Petrenko 2010, 338
17	Yasski **5/2**	1	S?	Se	R	Alekseeva 1976, 25–26

No.	SITE	Ex.	Position		Place	Source
Name barrow/grave			R L S	Ce-Centr. Se-Second	R L Ot	
18	Petrodolinskoe **1/9**	2	R	Se	R	Subbotin 2003, Tab. 48, 36–37
19	Nikolaevka/Efimovka **2/23**	+	R	Se	Ot	Shmagliy – Chernyakov 1985, 100, 105, 113
20	Nikolaevka/Efimovka **6/3**	+	L	Se	R?	
21	Nikolaevka/Efimovka **10/7**	1	L	Se	?	
22	Novogradovka **1/4**	2	?	?	?	Subbotin 2003, Tab. 48, 45–46
23	Alexandrovka **1/32A**	1	R	Se	?	Subbotin 2003, Tab. 48, 3
24	Mereni II **1/3**	6	L	Se	L	Dergachev – Sava 2002, Fig. 13.4
25	Roșcani **1/13**	4	L	Se	L	Dergachev – Borziyak – Manzura 1989, Fig. 6.3; Fig. 18.1–3
26	Roșcani **5/7**	3	R	Se	L	
27	Cîrnățeni **2/10**	+	L	Se	L	Demchenko – Levitskiy 1997, 16
28	Ștefan Vodă II 1/7	4	L	Se	R	Vysotskiy 1992, Fig. 33.1–2
29	Slobozia-I **1/15**	5	S?	Se	Ot	Vysotskiy 1992, Fig. 13.4
30	Slobozia-II **4/4**	2	?	?	?	Subbotin 2003, Tab. 47, 12–15
31	Slobozia-II **4/5**	2	?	?	?	
32	Semenovka **2/2**	3	L	Se	L	Subbotin 2003, Tab. 48, 17, 23–27, 47–50; Subbotin – Razumov – Sinika 2017, Fig. 9.8–9; Fig. 21.1–6; Fig. 56.4
33	Semenovka **8/15**	4	L	Se	R	
34	Semenovka **8/16**	1	L	Se	L	
35	Semenovka **19/9**	1	L	Se	L	
36	Podgorodnoe-Krestovaya mogila **1/19**	1	?	Se	?	Gudkova 1990, 61, Tab. 15, 8–9
37	Shirokoe/Alkaliya **33/3**	3	L	Se	?	Subbotin 2003, Tab. 48, 42–44; Ivanova 2013a, 249, Fig. 54
38	Diviziya **II 6/1**	1	?	Se	?	Subbotin – Sapozhnikov – Subbotin 2002, Fig. 7.1–2
39	Belolese **11/9**	+	L	Se	L	Subbotin – Dzigovskiy – Ostroverkhov 1998, 109, Fig. 42
40	Trapovka **1/11**	1	?	Se	?	Vanchugov – Zaginaylo – Toshchev 1976, Fig. 3.8; Subbotin 1977, Tab. XVI, 9; Subbotin 2003, Tab. 47, 1–6, 8
41	Trapovka **4/7**	6	S	Se	Ot	
42	Liman-Zakharkina mogila 3A/30	7	R	Se	L	Subbotin – Toshchev 2002, Fig. 10.6–13
43	Borisovka **9/6**	10	R	Se	L	Shmagliy – Chernyakov 1970, Fig. 50.2; Fig. 64.5–14
44	Glubokoe **1/24**	3	L	Se	?	Shmagliy – Chernyakov 1970, 45, Fig. 50.2; Subbotin 2003, Tab. 48, 29–31
45	Glubokoe **1/25**	+	L	Se	L	
46	Artsyz **1/22**	2+	R	Se	L	Shmagliy – Chernyakov – Alekseeva 1972; Alekseeva – Boltrik – Sapozhnikov 2021
47	Bashtanovka **4/25**	1	L	Se	?	Subbotin 2003, 136, Tab. 48, 25
48	Nerushay **10/13**	1	L	Se	Ot	Shmagliy – Chernyakov 1970, 85, Fig. 64.19; Subbotin 2003, Tab. 47, 9
49	Nerushay **10/14**	3	L	Se	Ot	
50	Kholmskoe **2/8**	2	R	Se	L	Gudkova – Chernyakov 1981, 71, Fig. 7.4–5, 8–9; Subbotin 2003, Tab. 48, 38–41
51	Kholmskoe **2/13**	2	L	Se	R	
52	Kamenka **1/8**	3	L	Se	?	Shmagliy – Chernyakov – Alekseeva 1970
53	Novokamenka **1/5**	3	R	Se	R	Shmagliy – Chernyakov – Alekseeva 1971; Subbotin 2003, Tab. 48, 32–34
54	Orlovka **1/9**	2	??	Se	?	Subbotin 2003, Tab. 48, 15–16

No.	**SITE**	**Ex.**	**Position**		**Place**	**Source**
Name barrow/grave			**R L S**	**Ce-Centr. Se-Second**	**R L Ot**	
55	Vlădiceni I **9/2**	**1**	**L**	**Se**	**Ot**	Fokeev 1989, 9, Fig. 11.4
56	Kubey **22/18**	**1**	**S**	**Se**	**?**	Subbotin *et al.* 1987, Fig. 43.2; Subbotin 2003, Tab. 48, 1–2
57	Kubey **23/16**	**1**	**R**	**Se**	**Ot**	
58	Giurgiulești **3/13**	**2**	**?**	**Se**	**?**	Khakheu – Popovich 2019, 115, Fig. 10.5–6
59	Taraclia **II 14/16**	**2**	**L**	**Se**	**L**	Sava – Agulnikov – Manzura 2019, Fig. 34.2–8
60	Petreşti **1/3**	**1**	**?**	**Se**	**?**	Yarovoy 1987, Fig. 5.1–4
61	Tîrpești /1	**1**	**S**	**Se**	**R**	Marinescu-Bîlcu 1964, 241
62	Răcăciuni /**?**	**2**	**?**	**?**	**?**	Tudor 1973, 283
63	Râmnicelu /**10**	**+**	**L**	**-**	**?**	Harţuche 1973, 18–19
64	**Şendreni /?**	**4**	**?**	**?**	**?**	Dragomir 1976, 58, Fig. 3
65	Brăilița /**3**	**2**	**R**	**-**	**Ot**	Harţuche 2002, 46–48, 55–56
66	Brăilița /**8**	**2**	**R**	**-**	**Ot**	
67	Brăilița /**9**	**1**	**R**	**-**	**L**	
68	Brăilița /**33**	**2**	**R**	**-**	**Ot**	
69	Luncavița-*Drumul Vacilor* **1/5**	**1**	**?**	**Ce**	**?**	Vasiliu 1995c, 118, Pl. IV.2
70	Mihai Bravu **2/3**	**1**	**?**	**Ce**	**?**	Vasiliu 1995b, 145–146, Pl. VI.3
71	Gurbănești **1/2**	**1**	**S**	**Se**	**Ot**	Rosetti 1959, 793, Fig. 15.4
72	Blejoi **I/1**	**1**	**R**	**Ce**	**Ot**	Frînculeasa *et al.* 2013, Pl. 13
73	Păulești **II/2**	**2**	**S**	**Ce**	**R**	Frînculeasa *et al.* 2013, Pl. 8.3–7
74	Ploiești-Triaj **I/2**	**1**	**?**	**?**	**?**	Frînculeasa *et al.* 2013, Pl. 17.4–7
75	Ploiești-Triaj **I/3**	**2**	**?**	**?**	**?**	
Total 75 complexes		**175 ex**	**S-8 L-28 R-19**	**Se 54 Ce -6**	**L18 R16 Ot14**	

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The Bronze Age mounds from Aliman (Constanţa County, Romania)

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Abstract

During a rescue excavation in 2019 two Bronze Age mounds were investigated in Aliman (Constanţa County). One of them was 28×21 m in diameter, ca. 1 m in height and contained two graves (T3). The other one was 22 m in diameter, ca. 1.40 m in height with a circular ditch and contained four graves (T4). At a distance of ca. 25 m south-east of the first mound (T3), an isolated grave was discovered. The earliest burial dates from the last third of the 4th millennium BC, several others from different phases of the first half of the 3rd millennium BC and, finally, the last one was added in the 2nd millennium BC. In this article, taking as a starting point the archaeological, bio-anthropological and radiocarbon research of the graves, we discuss the absolute chronology of more than one and a half millennia of burial mounds use in Dobroudja and the transformation of burial practices in this interval. Our results correlate with finds from burial mounds investigated in eastern and southern Romania, but also the wider steppe-like regions of Hungary, Bulgaria and Serbia.

***Key words**: Dobroudja, Bronze Age, burial mounds, absolute chronology, burial practices*

Introduction

In the summer of 2019, due to a contract between the Museum of National History and Archaeology from Constanţa and a private beneficiary, an archaeological excavation was carried out on a terrain located on the territory of Aliman commune, Constanţa County (*Pl. 1*), respectively on the plots A 815/58, A 815/59, A 815/60, Plot 2, where the construction of a winery with several utility annexes was planned. The land is located in the southwestern part of Aliman (at a distance of about 2 km from the town centre), on a hill, known topographically as *Dealul Macului*, near the road DJ 223, which connects Aliman and Floriile (*Pl. 2*).

The territory of Aliman community is known for the density of archaeological sites, due to its location in an area favourable to habitation, located near the Danube and crossed by wide and deep valleys. We mention here the fortress of Sacidava, an important fortification of the Danube *limes* in Roman times (Scorpan 1973, 267–331; 1978, 155–180; Colesniuc *et al.* 2020, 375–384); the strong fortified Getic centre from Adâncata-Floriile (Irimia 1983, 91–92; 1999, 71–82; 2004–2005, 319–384; 2007, 149–153; Talmaţchi 1994, 231–233; Vertan – Custurea 1995–1996, 315); a Getic cremation grave discovered in the summer of 1972 in the centre of Aliman, dated in the 2nd–3rd century AD (Scorpan 1974, 239–246), as well as traces of early medieval dwellings dating to the 10th–11th centuries AD (Papasima – Chera 1999, 289; Munteanu – Oprea 2007, 513).

Our study area is listed in the List of Historical Monuments from 2015 (LMI - Lista Monumentelor Istorice) as the archaeological site *“Tumuli, Aliman village, Aliman commune”* (CT-IsA-20171, vaguely located “within the perimeter of the entire commune” and dated in “2nd–3rd century AD, Roman times”);

under the same name and location, the site is also present in the National Archaeological Repertory (RAN - Repertoriul Arheologic Naţional code 61014.01) under the name *“Aliman Mounds”*.

Archaeological finds

Preliminary surface investigations, corroborated with the information obtained from the study of archive images, allowed the identification on the site of the future winery of two flattened mounds, which are part of a series of eight mounds found on *Dealul Macului*. The mounds were slightly visible on the ground level due to the natural errosion, ploughing, being also affected by a grapery in the 1980s. The mounds were named T1–T8, the numbering starting from North to South (*Pl. 2–3*). Four of them appear on the Artillery Firing Plans of the early twentieth century (*Pl. 2.2*). For the most accurate registration of the protection perimeters of the two existing mounds on the beneficiary’s land (T3 and T4), a topographic survey was carried out. Archaeological documentation was supplemented by an intrusive diagnosis, in order to record any funerary features or ditches outside the excavated perimeter. Excavation was carried out in rectangular sections, with stratigraphic controls on the N-S and E-W directions, by pickling with mechanical equipment in different stages and by successive manual scraping, down to the yellow loess layer (1.00/1.10 m below the present surface level) (*Pl. 4*). Regarding the stratigraphy, just under the modern humus layer with a thickness of 0.40/0.50 m there was a sterile brown soil layer with a thickness of 0.40/0.50 m, this being followed by the yellow, sterile soil, observed at 1.00/1.10 m below the current surface level.

Tumulus 3

The tumulus (mound) had an oval shape, being of medium size (28×21 m) (*Pl. 4*). The maximum preserved height was about 1 m and it was strongly flattened, due to the intensive agricultural works carried out in the area in the last decades. The excavation consisted of the marking of four sectors, thus obtaining two main cross-shaped stratigraphic controls, in the East-West and North-South directions. Following the stratigraphic observations, it was possible to document the mound construction: the mantle consists of yellow clay extracted from the margins of the mound, especially from its southern and southeastern parts. It was built directly over the yellow, sterile soil, which indicates a previous cleaning of the ancient humus (*Pl. 5*). The sectors were numbered from one to four clockwise. In Sector 1, located in the northeast, two burials were identified; no archaeological features were found in the other three.

T3/Grave 1 – Inhumation burial in a simple pit, the primary grave of the mound. The deceased was placed in extended position, with arms stretched along the body and the chin towards the chest. The orientation of the skeleton was NE-SW (*Pl. 6.2–3*). The pit was oval-shaped (1.80×1.50 m), its outline was identified at -1.10 m and the pit bottom reached -1.40 m (*Pl. 6.1*). Traces of red ochre were observed on the bottom of the pit. The structural preservation of the bones is firm, completeness is around 50%, with the right hand, the left arm and the rib cage missing. No grave goods were found. Anthropological determination: indeterminate; 7.0 years ± 24 months.

T3/Grave 2 – Double inhumation burial in a simple pit, as secondary grave dug into the mantle of the mound. The deceased (Individual 1) was placed in supine position, with arms stretched along the body, slightly bent towards the pelvis, and legs fallen to the right side. The orientation of the skeleton was E-W, and facing north (*Pl. 7.2–3*). The pit was rectangular with rounded corners (1.60×1.30 m) (*Pl. 7.1*). The outline of the pit was identified at -1.25 m and the pit bottom reached -1.40 m. South of Individual 1, near the left elbow, a child skull (Individual 2) was found, in a very precarious state of preservation. It probably belonged to a newborn, who was buried with the adult. The adult was sprinkled with red ochre, the lumps being identified as reddish spots on the bottom of the pit, on the north and west sides of the grave, as well as next to the deceased. As grave good, a clay vessel was placed in the southeastern corner of the pit. The vessel is an askoidal jug with a raised handle. The jug has a coarse paste, tempered with sand and chalk fragments. The outside part of the vessel has grey areas and the interior is brown-reddish. No decoration was observed, its state of preservation being precarious: the bottom and the upper side are missing (*Pl. 7.4*). Preserved dimensions: 11 cm in height, 11.5 cm maximum diameter. Anthropological determination: Individual 1: male; 18.5–39.4 years; Individual 2: indeterminate, 0.0–1.0 years.

Tumulus 4

Mound of medium size, circular in shape, with a diameter of 22 m (*Pl. 4*). The maximum height preserved was about 1.40 m. Positioned close to mound T3, it was flattened by intensive agricultural works made in the area. The research method approached was similar to the one used at T3, namely excavating four sectors numbered from one to four clockwise. Following the information provided by the two main stratigraphic controls (North-South and East-West oriented), two phases of tumulus construction were identified (*Pl. 8*):

- In the first phase, the funerary arrangement was small and corresponded to Gr.2. The grave was surrounded by an enclosing ditch conventionally named C1 (the outline was identified at -1.20 m, the final depth was -1.50 m and the width 0.60 m). The ditch was partially documented in its eastern half, where it was dug deeper in the yellow, sterile soil (*Pl. 11.2*). In the western half its trajectory was visible on the spot, then gradually climbed and got lost in the modern humus. Its northwestern part could not be identified at all. In the North-East area the ditch had a gap, which probably marked the entrance. The surface delimitated by C1 feature has a diameter of ca. 10.50 m, which would indicate the size of the mound in this phase. Much of the C1 feature as well as Gr.2 are in Sectors 1 and 4.
- The second phase corresponds to Gr.1, Gr.3 and Gr.4. Gr.1 intersects C1 ditch and is placed eastwards of Gr.2. The pit of Gr.4 overlaps the C1 ditch and is located south of Gr.2. In this phase, we are witnessing an increase in size of the mound mainly to the south and southeast areas. Concerning the building method, the mantle was placed directly on the sterile soil and was made by ancient humus mixed with yellow, sterile clay. A clay extraction area for this purpose was documented nearby, in Sector 1. It was outlined in a form of a very shallow and poorly preserved *in situ* ditch (probably due to the modern interventions in the area).

T4/Grave 1 – Inhumation burial in a simple pit. The grave overlaps the C1 ditch (*Pl. 9.1*). The deceased was laid on the back, slightly tilted to the right side. The left arm was flexed, right arm being stretched along the body, the legs are flexed on the right side. The skeleton´s orientation is N-S, and facing west (*Pl. 9.2–3*). The pit had a rectangular shape with rounded corners (1.90×1.20 m), the outline was identified at -1.20 m and the pit bottom reached -1.55 m. No grave goods were found. Anthropological determination: indeterminate, 12.0–14.0 years.

T4/Grave 2 – Inhumation burial in a simple pit. The deceased was placed in supine position with the arms along the body, and the legs initially with raised knees that have subsequently fallen to the left side. The orientation of the skeleton is NE-SW (*Pl. 10.1–2*). The pit shape is rectangular with rounded corners (1.75×1.00 m), its outline was identified at a depth of -1.25 m and the pit bottom reached -1.60 m. The grave was surrounded by a circular ditch. The bones were in a very good state of preservation. The head was propped up and slightly raised on a yellow clay mixed with black soil “pillow”. No grave goods were found. Anthropological determination: indeterminate, 14.0–18.0 years.

T4/Grave 3 – Inhumation burial in a simple pit. The grave was found in the stratigraphic control between Sectors 2 and 3, its shallow pit being observed in the mantle of the mound. The position of the deceased was crouched on the left side. The orientation of the skeleton is NE-SW (*Pl. 10.3–5*). The burial was destroyed by modern interventions, leaving only the individual's pelvis and legs. The pit outline was identified at -1.00 m and the pit bottom reached -1.25 m. No grave goods were found. Anthropological determination: male, 27.1–32.0 years.

T4/Grave 4 – Inhumation burial in a simple pit. The grave pit was dug in the C1 ditch but did not reach its bottom (*Pl. 11.3*). The deceased laid in supine position, with legs bent to the left. The preservation state of the bones is very precarious: a few skull fragments, a few ribs, left hand and parts of legs remained. The orientation of the skeleton is W-E (*Pl. 11.1*). The outline of the pit was identified at -1.15 m and the pit bottom reached -1.20 m. No grave goods were found. Anthropological determination: indeterminate, 3.0 years ± 12 months.

The flat grave

At a distance of ca. 25 m southeast of the T3 mantle, during the archaeological survey, an isolated grave was identified:

Grave 1/S – Inhumation burial in simple pit, rectangular with rounded corners in shape (1.70×1.20 m), the pit outline was identified at -1.60 m and the pit bottom reached -2.00 m. The deceased laid on the back, slightly tilted to the left side, oriented E-W and facing south (*Pl. 11.4–5*). The pit was filled with a dusty, yellow soil making the difference between this soil and sterile loess very difficult to notice. The preservation state of the bones is very good. No grave goods were found. Anthropological determination: male, 35.2–51.5 years.

Anthropological data

Material and methods

The analysed human skeletal remains came from two Bronze Age mounds discovered during the 2019 archaeological campaign from Aliman *Alira* (comm. Aliman, Constanţa County). In the two mounds, recorded as T3 and T4 by the authors of the research, skeletal remains were identified from seven individuals, as follows (T3: one individual in Gr.1 and two individuals in Gr.2; T4: one individual in each of Gr.1, Gr.2, Gr.3 and Gr.4). In addition to this, during the same campaign, under the surveillance of archaeologists, another grave containing the skeletal remains of an individual (Gr.1/S) was identified at 25 m southeast of the T3 mantle. The eight individuals belong to the osteological collection of the Museum of National History and Archaeology Constanţa.

Prior to the actual research of the osteological and dental fragments, the material was cleaned from sediment with water and partially restored for the examination of skeletal features. The anthropological analysis aimed mainly at establishing the minimum number of individuals, the degree of representativeness, the skeletal inventory, taphonomic changes and the state of preservation of the osteological material (Fernández-Jalvo – Andrews 2016).

Determining the biological sex of individuals is a very important step for establishing the biological profile of a population. As such, sex influences the analysis of other skeletal features (skeletal stature, age-at-death). In the present study, it was determined only in adults, based on the discriminatory features of the pelvis (ventral arch, subpubic concavity, medial aspect of the ischiopubic ramus, large sciatic notch and preauricular sulcus) and the skull (nuchal crest, mastoid process, supraorbital margin, glabella and mental eminence) (Buikstra – Ubelaker 1994, 16–21). At the same time, for the highest possible accuracy in determining sex, a series of practices or recommendations for its diagnosis was adopted (Acsádi – Nemeskéri 1970, 75–87; Ferembach *et al.* 1980, 517–527).

Regarding the age-at-death, different estimation methods were used, depending on the age class of the individual: subadult or adult. Although the anthropological literature proposes numerous methods for determining the age-at-death for subadults, based on regression equations related to the maximum size of long bone diaphysis (Facchini – Veschi 2004; Bernert – Evinger – Hajdu 2007; Cardoso – Abrantes – Humphrey 2014, to name a few), most of them were obtained on medieval (not prehistoric) skeletal lots. In addition, the individuals come from other geographical units than the Eurasian Steppe. Therefore, in our study, in order to estimate the age-at-death of subadults, we used not only cranial measurements (Buikstra – Ubelaker 1994, 45; Schaefer *et al.* 2009, 29–31), the sequence of tooth formation and eruption (Ubelaker 1978, 46–47) and the degree of fusion of the epiphyses to the diaphysis (Ubelaker 1978, 53), but also dimensional comparisons with other skeletons of known age from the collection of the Anthropology Laboratory of the "Vasile Pârvan" Institute of Archaeology.

Much less accurate is the estimation of the age of adult individuals, in which values often fluctuate within very wide limits. In order to prevent, as much as possible, the obtaining of such values, in our research we took into account several methods of analysis. Subsequently, to estimate the age, we averaged the values obtained, based on all methods. Thus, regarding the skull, the degree of obliteration of the cranial sutures was recorded (Meindl – Lovejoy 1985, 63). Two other methods were related to features of the coxal bones: the examination of auricular surfaces (Lovejoy *et al.* 1985) and of the changes in the pubic symphyses' facets (Brooks – Suchey 1990). Some degenerative morphological changes in the ribs are also good indicators of estimating age-at-death: the geometry of the articular facet and the surface texture of the costal tubercle of the first rib (DiGangi *et al.* 2009). Other methods that we have taken into account are extremely valuable because, through them, it is certified that an adult is in the category of a young adult: the degree of fusion of the medial clavicular epiphyses (Shirley – Jantz 2010) and the one of the first two sacral vertebrae (S_1-S_2) in anterior view (Ríos – Weisensee – Rissech 2008). In order to classify the individuals of this study according to their age-at-death, scholarly literature was consulted (Buikstra – Ubelaker 1994, 9): fetal (F: < birth), infant (I: birth–3.0 years); child (C: 3.0–12.0 years); adolescent (AO: 12.0–20.0 years); young adult (YAd: 20.0–35.0 years), middle adult (MAd: 35.0–49.0 years) and old adult (OAd: > 50.0 years old).

The shape and size of the bones were highlighted by taking bilateral (L = left, R = right) measurements: cranial (Martin 1928, 625–678; Bräuer 1988, 160–192) and postcranial (Martin 1928, 1005–1052; Bräuer 1988, 193–232) and by calculating their indices (*Supplementary Table 1*).

Influenced by many external and environmental factors, the most important of which are nutrition, climate and lifestyle, the skeletal stature was calculated for the Aliman population for both subadults (Visser 1998, 415) and adults (Ruff *et al.* 2012, 606), based on regression equations, using the maximum lengths of long bones. Skeletal weight was also calculated, a very important standard related to the growth, development and health of individuals. The estimation of body mass was based on regression equations that include the diameter of the middle of the tibial diaphysis (Visser 1998, 415–416), for children (3.0–12.0 years) and the vertical (transversal) diameter of the femoral head (Auerbach – Ruff 2004, 334) for adult individuals (20+ years).

Indispensable from the anthropological analyses are the observations related to the dental and osteological pathological changes, which refer to the health status of individuals and, implicitly, to their ability to respond effectively to the action of multifactorial stress. For the few manifestations identified in Aliman we used several treatises from the scholarly literature (Rogers – Waldron 1995; Ortner 2003; Hillson 2005).

Variability, genetic inheritance/kinship and biodistance can be traced through anatomical variants or non-metric traits. In order to achieve this, we considered the recording of discrete characters from the skull and from the postcranial skeleton (Finnegan 1978; Hauser – De Stefano 1989; Mann – Hunt – Lozanoff 2016), as well as from the teeth (Turner II – Nichol – Scott 1991; Haddow 2012). We tracked their number and frequency, their placement, their shape and size, their degree of development or their bilaterality.

The investigation of the lifestyle of the analysed individuals was also carried out by recording the degree of development of enthesophytes, exclusively for adults. Musculoskeletal markers of biomechanical stress (functional, occupational) represent the result of daily, repeated, constant actions, performed with different intensities in the bone through ligaments, tendons and joint capsules. In our study, we examined several bone areas (entheses), bilaterally, from the: clavicle, scapula, humerus, radius, ulna, femur, patella, tibia and calcaneus (al-Oumaoui – Jiménez-Brobeil – du Souich 2004; Mariotti – Facchini – Belcastro 2007; Myszka – Piontek 2012; *Supplementary Table 2*).

Results

T3/Grave 1 – General characteristics. MNI: 1; preservation: very good; state of representation: approximately complete; sex: indeterminate; age-at-death: 7.0 years ± 24 months (dentition); age category: C (*infans* II); stature: 1108.4 ± 97.0 mm (L tibia); weight: 21.8–22.0 ± 0.2 kg (tibiae); taphonomy: traces of red ochre on the upper part of the skull.

Skeletal inventory. The neurocranium is approximately whole (missing the left temporal), but fragmentary. Zygomatic and sphenoid fragments have been preserved from the facial skeleton. Three permanent teeth were identified (LC$^{\#}$; RC$^{\#}$; LM^{1}). The spinal and costal skeleton are fragmented and incomplete. Only the elements from the right side have been preserved from the shoulder girdle. The pelvis lacks several fragments from the sacrum, pubis and coccyx. Some of the limb bones are complete (ulna, femur and L tibia), others incomplete (humeri, radii, R femur, R tibia, fibulae), while others have not been preserved (R ulna, patellae). Several phalanges of the hand, tarsals and metatarsals were also recovered.

Biomorphometric characteristics. The forehead has oval edges and is camemethopic. The L ulna is eurolenic, the L femur is platymer with a null pilaster, while the tibiae are eurycnemic.

Non-metric traits. a) Cranial – supraorbital notch (R); supranasal suture; zygomaticofacial foramen (one wide, L; one wide and one narrow, R); parietal foramen (L); asymmetric apical bone; lambdoid ossicles (bilat.); hypoglossal canal (partially divided, R); tympanic dehiscence (R); mastoid foramen (one, on temporal, R); b) postcranial – Allen's fossa (L); superior articular atlas facet (simple, bilat.).

T3/Grave 2 (MNI = 2)

Grave 2, Individual 1 – General characteristics. Preservation: very good; state of representation: approximately complete; sex: male (coxals, skull); age-at-death: 18.5–39.4 years (pubic symphyses, auricular surfaces, cranial sutures, costal sternal heads, medial clavicular extremities); age category: YAd; stature: 166.4 [164.6–168.2] cm (middle); weight: 63.4–63.6 kg (femoral heads); taphonomy: some spots of red ochre on the skull (*Fig. 1.a*) and pelvis.

Skeletal inventory. The neurocranium is approximately complete, lacking several fragments from the basal segment. The zygomatics, the sphenoid and hyoid fragments, the maxilla and the mandible have been preserved from the skeleton of the face. Twenty-seven permanent teeth were identified (LI^{1}, LC$^{\#}$-LM^{3}; RP^{1}-RM^{3}; LI$_{1}$-LP$_{2}$, LM$_{2}$-LM$_{3}$; RI$_{1}$-RM$_{3}$); five teeth were postmortem lost (LI^{2}; RI^{1}-RC$^{\#}$;

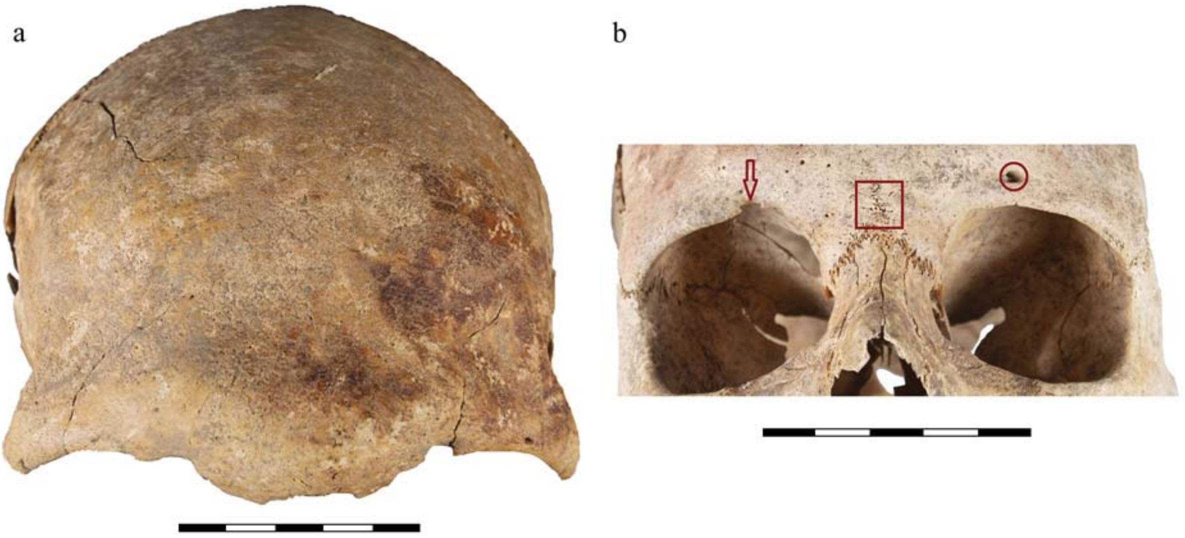

Fig. 1. a) Red ochre staining on the cranium (frontal, anterior – T3/Gr.2, I1); b) Open supranasal suture (square), left supraorbital foramen (circle) and right supraorbital notch (T3/Gr.2, I1)

LM$_1$). The spinal and costal skeleton are fragmented and incomplete. Considering the shoulder girdle of this individual, the clavicles are well preserved, while the scapulae are rather fragmentary. Regarding the pelvic bones, the coccyx is missing. The long bones of the limbs are relatively well represented and preserved. The patellae and the hand bones are missing.

Biomorphometric characteristics. The skull is long, narrow, mesocran, high, orthocran and metriocran. The forehead has a moderate minimum width, a narrow maximum width, oval edges, it is eurymethopic and camemethopic. The parietals are curved, and the occipital is of medium width. The face is moderately wide. The mandible is moderate intercondylarly, very wide intergonionally and dolicostenomandibular. The L orbit is of medium length. The L clavicle is robust and short. The sacrum is platihieric. The humeri are euribrahic, the radii are of moderate length, and the ulnae are eurolenic. The R femur is eurymeric and has a weak pilaster, and the tibiae are mesocnemic.

Pathology. Dental diseases: dental calculus (LI^1, LC$^{\#}$-LM^3 – lingual, labial and buccal; RP^1-RM^3 – lingual and buccal; LI$_1$-LI$_2$ – labial, LI$_1$-LC$_{\#}$ – lingual; RI$_1$-RM$_3$ – lingual, RI$_1$-RC$_{\#}$ – labial).

Non-metric traits. a) Cranial – supraorbital notch (bilat.); supraorbital foramen (bilat.); supranasal suture (*Fig. 1.b*), zygomaticofacial foramen (multiple foramina, narrow, bilat.); parietal foramen (R); apical bone; lambdoid ossicles (bilat.); petrosquamous suture (bilat.); condylar canal (open, L); direction of flexure for superior sagittal sulcus (bifurcated); mental foramen (one, bilat.); mylohyoid bridge (partial, in the centre of the mylohyoid canal, R); styloid process (elongated, R); paramastoid process (bilat.); b) postcranial – Allen's fossa (R); hypotrochanteric fossa (bilat.); acromial articular facet (R); rhomboid fossa (bilat.); superior articular atlas facet (simple, bilat.); c) dental – hypoconulid (RM$_1$, moderate); rocker mandible (partially).

Grave 2, Individual 2 – General characteristics. Preservation: very good; state of representation: poorly represented; sex: indeterminate; age-at-death: 0.0–1.0 years (cranial measurements, dimensional comparison); age category: I.

Skeletal inventory. Only osteological remains from the neurocranium were preserved from the skeleton: fragments of the parietal squamae, the R temporal, the occipital squama and the sphenoid.

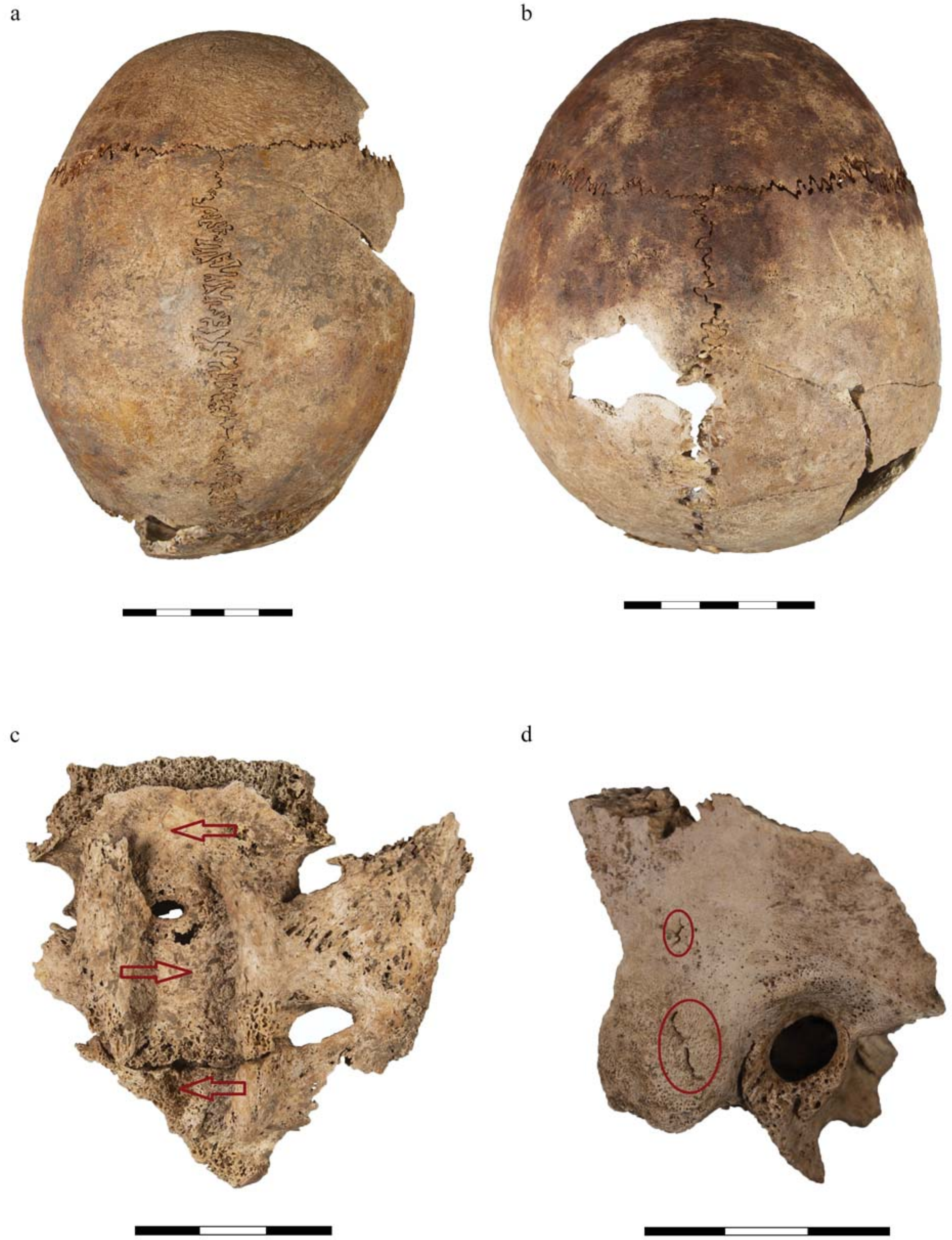

Fig. 2. *a) Red ochre staining on the cranium (calotte, superior – T4/Gr.1); b) Red ochre staining on the cranium (calotte, superior – T4/Gr.2); c) Spina bifida occulta (sacrum S3-S5, posterior – T4/Gr.3); d) Remnants of the petrosquamous suture (right temporal bone – T4/Gr.4)*

T4/Grave 1 – General characteristics. MNI: 1; preservation: mediocre; state of representation: approximately complete; sex: indeterminate; age-at-death: 12.0–14.0 years (epiphyseal fusion); age category: AO; taphonomy: traces of red ochre on the skull (*Fig. 2.a*) and arms.

Skeletal inventory. The neurocranium is partially complete (fragments of the frontal and R temporal are missing in particular). From the skeleton of the face have been preserved the L zygomatic, the R maxilla and the mandible (with the mental tubercles well highlighted). Twenty permanent teeth were identified (RI^2-RM^3; LI_2-LM_3; $RC_{\#}$-RM_3); four teeth were postmortem lost (RI^1; LI_1; RI_1-RI_2). Vertebrae from all segments have been preserved from the column, while the ribs are few and very fragmentary. The shoulder girdle is represented only by the L scapula. The sternum is missing. The pelvis is well preserved, except for the sacrum. The R radius, the bones of the hands and the R patella are missing.

Biomorphometric characteristics. The skull is dolichocran. The forehead is camemethopic, the parietals flattened, and the occipital wide. The mandible is dolicostenomandibular. The L ulna is eurolenic. The femurs are platymer, with a strong pilaster on the L. The tibiae are mesocnemic and the left patella is wide.

Pathology. 1) Dental diseases: dental calculus (RI^2 – labial; RP^1-RM^2 – buccal; LM_1-LM_2, RM_1-RM_2 – lingual); dental enamel hypoplasia ($C_{\#}$, bilat.); 2) Metabolic diseases: healed *cribra orbitalia* (L).

Non-metric traits. a) Cranial – supraorbital foramen (L); zygomaticofacial foramen (one wide, R); lambdoid ossicles (bilat.); condylar canal (open, bilat.); mastoid foramen (one, on temporal, L); mental foramen (one, bilat.); b) postcranial – hypotrochanteric fossa (bilat.); subcoronoid foramen (L); inferior talar articular surface (double, bilat.); superior articular atlas facet (simple, bilat.); c) dental – hypoconulid (LM_1, LM_3, moderate; RM_1, small).

T4/Grave 2 – General characteristics. MNI: 1; preservation: good; state of representation: approximately complete; sex: indeterminate; age-at-death: 14.0–18.0 years (epiphyseal fusion); age category: AO; taphonomy: red ochre traces on skull (*Fig. 2.b*), right shoulder and feet.

Skeletal inventory. The neurocranium is approximately complete, but has some damage to the basal segment. The well-preserved facial skeleton lacks the inferior nasal conchae and the hyoid. The mandible has well-marked mental tubercles. Twenty-one permanent teeth were identified (LI^1-LM^2; RI^1-RM^2; LP_1, LM_2; $RC_{\#}$-RM_2); seven teeth were postmortem lost (LI_1-LP_1, LM_1; RI_1-RI_2). The spine, sternum and costal skeleton are well preserved, with a few gaps at each segment. The R clavicle is missing from the shoulder girdle. Among the long bones of the limbs, better represented are the humeri, the L radius and the femurs. The patellae, metatarsals, and phalanges of the foot are missing.

Biomorphometric characteristics. The skull is brachicran, orthocran, and tapeinocran. The forehead has oval edges, is eurimetopic and orthometopic. The parietals are curved and the occipital is wide. The orbits are mesoconch, the nose is mesorhine, and the superior alveolar arch is mesuran. The palate is brahistaphylline and chemostaphylline, and the facial profile is orthognathic. The mandible is dolicostenomandibular. The humeri are euribrah, and the L ulna is eurolenic. The L femur is platymeric and the R, hyperplatimeric, with a weak pilaster.

Pathology. 1) Congenital and neuromechanical abnormalities: *spina bifida occulta* (at least in the S_3-S_5 segments); spondylosis/ discitis (cervical and lumbar vertebrae); 2) dental diseases: dental calculus (I^1-I^2, bilat. – labial; M^1-M^2 bilat. – buccal; $LC^{\#}$ – lingual; RM^2 – lingual; RM_1-RM_2 – buccal; RP_2, RM_2 – lingual); 3) infectious diseases: periostitis (on the tibial diaphysis, bilat.).

Non-metric traits. a) Cranial – supraorbital notch (R); supraorbital foramen (L); zygomaticofacial foramen (absent, L; one, wide, R); lambdoid ossicles (bilat.); petrosquamous suture (bilat.); condylar canal (open, bilat.); mastoid foramen (one, on temporal, bilat.); mental foramen (one, bilat.); mylohyoid bridge (partial, near the mandibular foramen, R); b) postcranial – hypotrochanteric fossa (bilat.); third trochanter (L); preauricular sulcus (bilat.); inferior talar articular surface (double, bilat.); anterior calcaneal facet double (absent, bilat.); c) dental – interruption groove (in the middle of the cingulum, LI^1); dental tubercle (pronounced, LI^2-LC$^\#$; strong, RC$^\#$); metacone (small, M^2, bilat.); congenital absence (M^3, M$_3$, bilat.).

T4/Grave 3 – General characteristics. MNI: 1; preservation: poor; state of representation: partially represented; sex: male (coxals); age-at-death: 27.1–32.0 years (auricular surfaces; sacral fusion); age category: YAd; weight: 71.9 kg (R femoral head).

Skeletal inventory. The skull and the dentomaxillary apparatus are missing. Postcranially, several vertebrae from the thoracolumbar segment have been preserved. Regarding the ribs, only small fragments, without precise symmetry, have been conserved. The pelvic girdle is incomplete. Fragments of all long bones, several tarsals and metatarsals, were also identified.

Biomorphometric characteristics. The right femur is platyimer and the right tibia is eurycnemic.

Pathology. 1) Congenital and neuromechanical abnormalities: *spina bifida occulta* (at least in the S$_3$-S$_5$ segments, *Fig. 2.c*); 2) intervertebral disk hernia (Schmorl`s nodes on lumbar vertebrae); 3) infectious diseases: inflammative porosities on bazioccipital – tab. interna.

Non-metric traits. Postcranial – hypotrochanteric fossa (bilat.); inferior talar articular surface (double, bilat.).

T4/Grave 4 – General characteristics. MNI: 1; preservation: mediocre; state of representation: partially represented; sex: indeterminate; age-at-death: 3.0 years ± 12 months (dentition); age category: C (*infans* I); taphonomy: red ochre stains on upper skull.

Skeletal inventory. Fragments of parietal squamae, R temporal, and occipital squama have been preserved from the neurocranium. The viscerocranium is represented only by the L zygomatic, a fragment of the sphenoid, the maxilla and the mandible. Twelve deciduous and four permanent but unerupted teeth were identified (Li^1-LM^1; Rp^1-RM^1; Lp$_1$-LM$_1$; Rp$_1$-RM$_1$); nine deciduous teeth were lost postmortem (Ri^1-Rc$^\#$; i^1-c$^\#$, i^1-c$^\#$, bilat.). From the postcranial skeleton were preserved a body and a vertebral arch, some rib fragments, a fragment of the right scapula and fragments of the diaphysis of long bones (humeri, radii, L ulna, L femur, tibiae and R fibula) and two metatarsals.

Pathology. 1) Metabolic diseases: *porotic hyperostosis* (*cribra cranii*, left parietal, exocranial); 2) infectious diseases (chronic sinusitis/ rhinitis).

Non-metric traits. a) Cranial – zygomaticofacial foramen (one wide and one narrow, L); petrosquamous suture (R) (*Fig. 2.d*); directions of flexure for superior sagittal sulcus (bifurcated); mental foramen (one, bilat.); b) dental – metacone (small, LM^1); Carabelli's cusp (small cusp, M^1, bilat.); anterior fovea (faint groove, M^1, bilat.).

Grave 1/S – General characteristics. MNI: 1; preservation: good; state of representation: approximately complete; sex: male (coxals, skull); age-at-death: 35.2–51.5 years (pubic symphyses, auricular surfaces, cranial sutures); age category: MAd; skeletal height: 177.2 [175.1–179.3] cm (high); skeletal weight: 73.3–74.2 kg (femoral heads).

Skeletal inventory. The neurocranium is well preserved and represented, except for some fragments in the area of the lambdoid sutures, the R temporal, and the basal segment. The zygomatics and fragments of the sphenoid, maxilla and mandible have been preserved from the facial skeleton. Eighteen permanent teeth were identified (LP^1-LM^2; RI^2, RP^2-RM^2; LI$_2$-LM$_1$; RI$_2$-RC$_\#$, RP$_2$-RM$_2$); M$_3$ was lost antemortem bilaterally, and ten teeth were lost postmortem (LI^1-LC$^\#$, RI^1, RC$^\#$; LI$_1$, LM$_1$-LM$_2$; RI$_1$, RP$_1$). The spine and sternum are missing, while the costal skeleton is incomplete and fragmentary. Regarding the girdles, the right clavicle, the sacrum and the coccyx are also missing. Skeletal remains from the upper limbs, except for the R humerus and the carpals, have been preserved. The patellae and phalanges are missing from the lower limbs.

Biomorphometric characteristics. The skull is very narrow. The forehead is wide according to the minimum width, narrow following the maximum width, has oval edges, is eurimetopic and orthometopic. The orbits have moderate lengths. The mandible is wide (intercondylar and intergonional) and dolicostenomandibular. The L humerus is euribrah, the L radius is of medium length, and the L ulna is eurolenic. The L femur is eurymeric with a medium pilaster, while the R one is platymer with a null pilaster. The tibiae are platycnemic.

Pathology. 1) dental diseases: dental calculus (I^2-$C^\#$ bilat. – labial); antemortem tooth loss (M_3 bilat.); dental caries (LP^1 – occlusal; RM^1-RM^2 – distal; RM_2 – buccal); radicular fragments (RI^2; LP_2); 2) joint diseases: osteoarthritis (porous surface with irregular contour – at the level of the L medial clavicular head; osteophytes – hand phalanges, palmar).

Non-metric traits. a) Cranial – supraorbital notch (L); supraorbital foramen (multiple foramina, R); zygomaticofacial foramen (one wide and one narrow, L; absent, R); mental foramen (one, bilat.); mandibular torus (moderate, bilat.); b) postcranial – exostoses on the trochanteric fossa (R); lateral tibial squatting facets (bilat.); acetabular crease (bilat.); acromial articular facet (L); inferior talar articular surface (double, bilat.); anterior calcaneal facet double (bilat.); peroneal tubercle (R); c) dental – rocker mandible (partially).

Table 1. Synoptic table with the main anthropological characteristics highlighted in the individuals from the Bronze Age burials of Aliman Alira

Grave	Sex	Age-at-death (yrs.)	Stature	Body mass (kg)	Osteological and dental pathologies
T3/Gr.1	–	7.0 (C)	1108.4 mm	21.8–22.0	–
T3/Gr.2, I1	M	18.5–39.4 (YAd)	166.4 cm (middle)	63.4–63.6	Dental calculus
T3/Gr.2, I2	–	0.0–1.0 (I)	–	–	–
T4/Gr.1	–	12.0–14.0 (AO)	–	–	Dental calculus; enamel hypoplasia; *cribra orbitalia*
T4/Gr.2	–	14.0–18.0 (AO)	–	–	Spina bifida *occulta*; spondylosis/ discitis; dental calculus; periostitis
T4/Gr.3	M	27.1–32.0 (YAd)	–	71.9	Spina bifida *occulta*; intervertebral disk hernia; inflammative porosities
T4/Gr.4	–	3.0 (C)	–	–	*Hyperostosa porotica* (*cribra cranii*); sinusitis/ rhinitis
Gr.1/S	M	35.2–51.5 (MAd)	177.2 cm (high)	73.3–74.2	Dental calculus; antemortem tooth loss; dental caries; radicular fragments; osteoarthrosis

Burial practices, relative, and absolute chronology

The mounds from Aliman are part of a larger display of such monuments from Dobroudja and north-eastern Bulgaria (Schuster *et al.* 2011, 58–59; Ailincăi *et al.* 2014; 2016, with previous bibliography; Alexandrov – Slavchev – Tonkova 2021). Series of mounds were documented at Baia, Ceamurlia de Jos, Jurilovca, Sălcioara, Zebil, Lăstuni, Mihail Kogălniceanu, Luncaviţa, Mihai Bravu in Dobroudja (Schuster *et al.* 2011, 58–59) or the spectacular area from the southern part of the Prut-Dniestr interfluve (Topal – Vornic – Popovici 2019, 17–19, Fig. 7–10), let alone the northeastern part of Bulgaria, especially in Vetrino area (Alexandrov – Slavchev – Tonkova 2021, 24, Pl. II). Dobroudja is a very important part of the Yamnaya story since it represents one of three main routes of the migration towards west (Dani 2020, 51–52, Fig. 8). New infrastructure projects such as highways, wind turbines or expansion of localities create the opportunity for new excavations in the region, which, complemented by interdisciplinary approaches focusing on chronology, biological ancestry, diet, activity patterns of the individuals, provide a better understading of the lifestyle of these communities[1].

In order to obtain detailed information about the chronological sequence in which the two mounds investigated in Aliman were raised and used, seven samples of human bone, one from each grave, were selected and sent to be radiocarbon dated. The analyses were performed at Bristol Radiocarbon Accelerator Mass Spectrometry Facility (BRAMS) within the framework of the ERC Advanced project 788616: The Yamnaya Impact on Prehistoric Europe (YMPACT). The results generated are presented in *Table 2*.

Table 2. Radiocarbon dates of the graves from Aliman

Context	**Sample**	**Lab code**	**BP date**	**BC calibrated date (95.4% probability)[2]**
T3/Gr.1	Human bone	BRAMS-3569	4516±29	3357–3263 (30.9%) 3247–3101 (64.5%)
T3/Gr.2	Human bone	BRAMS-3570	4279±30	3008–2987 (2.4%) 2931–2872 (91.2%) 2799–2782 (1.9%)
T4/Gr.1	Human bone	BRAMS-3571	4157±29	2878–2661 (89.5%) 2655–2631 (6.0%)
T4/Gr.2	Human bone	BRAMS-3572	4418±28	3318–3239 (11.7%) 3173–3164 (0.8%) 3105–2921 (82.9%)
T4/Gr.3	Human bone	BRAMS-3573	3316±27	1669–1656 (1.7%) 1635–1608 (93.8%)
T4/Gr.4	Human bone	BRAMS-3574	4390±28	3083–2916 (95.4%)
Gr.1/S	Human bone	BRAMS-3575	4096±28	2859–2806 (20.6%) 2753–2721 (7.9%) 2703–2571 (64.3%) 2517–2500 (2.6%)

The calibration and modelling of the ^{14}C dates (*Figs. 3–4*) revealed five burial sequences. Given the proximity of the two mounds, the results were analysed together. However, it should be noted that further research of the other burial mounds of the necropolis could alter the chronological frame presented below. In this article, we do not aim to offer a definitive picture of the absolute chronology of these funerary monuments in the region, but rather intend to explore the processes by which these two mounds were built and how they correlate with the wider tumular phenomenon. Thus, firstly, mound T3 was built for Gr.1; it was followed by mound T4 built for Gr.2, with the circular ditch around it, and then Gr.4 shortly after; the third sequence is represented by Gr.2 from the Mound T3, the fourth one by Gr.1 from Mound T4 and Gr.1/S from survey, and, finally, the fifth one by Gr.3 from Mound T4. The

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[1] Samples from the mounds excavated in Aliman are currently part of aDNA research carried out at Johannes Gutenberg-Universität Mainz as well as isotope research carried out at the University of Bristol within the framework of the Yamnaya Impact on Prehistoric Europe project.

[2] The C14 dates were calibrated with OxCal v4.4.4 Bronk Ramsey (2009); r:5 Atmospheric data from Reimer *et al.* (2020).

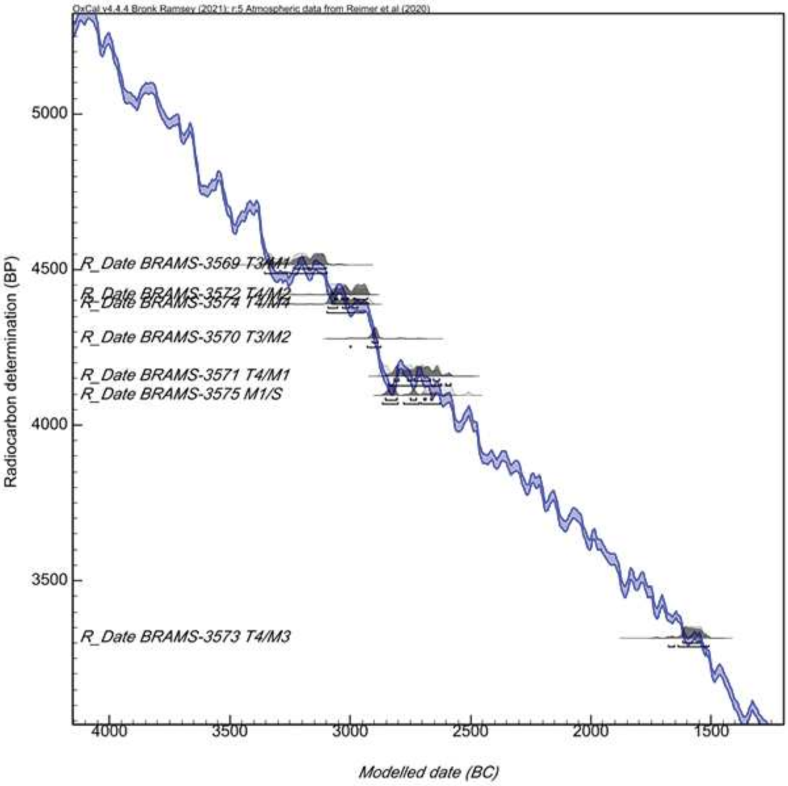

Fig. 3. Modelled dates from Aliman

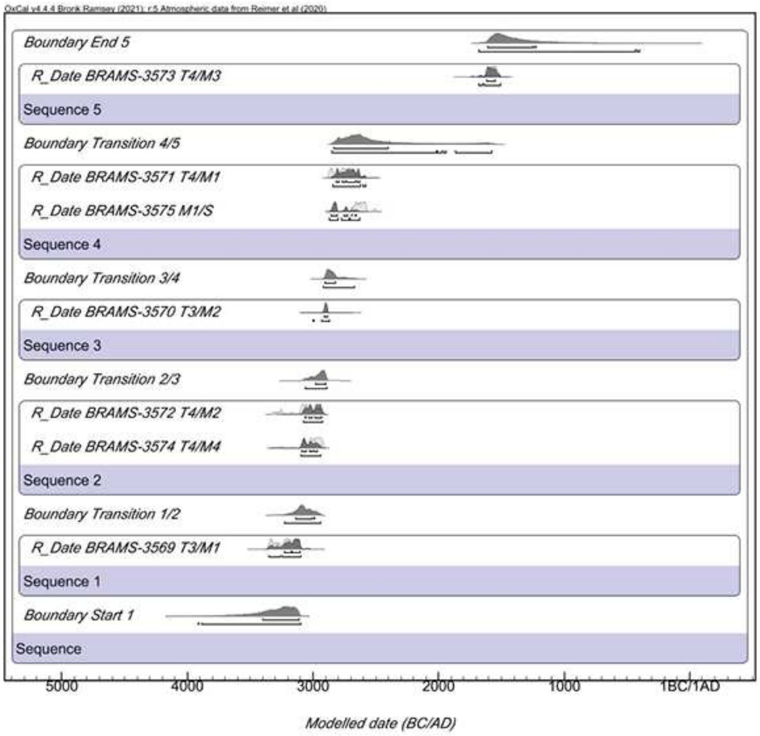

Fig. 4. The burial sequences from Aliman

stratigraphic information, along with the characteristics of the burial ritual listed in *Table 3*, and the ^{14}C dates obtained for the graves in Aliman enable a more complex discussion regarding the absolute and relative chronology of burial mounds in Dobroudja as well as the transformation of burial practices in time.

Table 3. Data on stratigraphic position, sex, age, position and orientation of bodies

Grave	No. ind.	Main grave	Secondary grave	Sex	Age	Position	Orientation
T3/Gr.1	1	x	–	Indet.	7.0	Extended	NE–SW
T3/Gr.2 (Ind. 1)	2	–	x	M	18.5–39.4	Supine	E–W
T3/Gr.2 (Ind. 2)	3	–	x	Indet.	0.0–1.0	–	–
T4/Gr.1	4	–	x	Indet.	12.0–14.0	Supine, slightly tilted on the right side	N–S
T4/Gr.2	5	x	–	Indet.	14.0–18.0	Supine	NE–SW
T4/Gr.3	6	–	x	M	27.1–32.0	Crouched on the left side	NE–SW
T4/Gr.4	7	–	x	Indet.	3.0	Supine	E–W
Gr.1/S	8	–	–	M	35.2–51.5	Supine, slightly tilted on the left side	E–W

The first phase of mound construction dates from the last third of the 4th millennium BC when the primary burial (Gr.1) of Mound 3 (T3) was performed (3357–3101 cal BC[3]). Gr.1 contained an individual laid in extended position in an oval pit, while in secondary Gr.2, individual 1 was laid in a typical Yamnaya posture, supine with raised knees and arms along the body, and had been sprinkled with ochre. The characteristics of the funerary ritual in the primary grave as well as the stratigraphic relationship with the secondary grave (Gr.2) are of particular importance.

Analogies for the practice of laying the dead in extended position were found in grave 3 from Mound 1 in Vităneşti, southern Romania (Frînculeasa – Mirea – Trohani 2017), grave 3 from mound II in Sărăteni (Moldova) (Leviţki – Manzura – Demcenko 1996, 36), and grave 6 from Tiszavasvári-Deákhalom in Hungary (Dani 2011, 28; Horváth *et al.* 2013, 160). Grave 2 from *Ciganska humka* in Šajkaš, Serbia, should also be mentioned here. Despite the absence of human osteological remains, the long shape and size of the wooden funerary structure suggest it could have been built for an individual laid in extended position, being very similar to that uncovered in grave 6 from Tiszavasvári-Deákhalom (Koledin *et al.* 2020, 355)[4]. Other graves hold valuable information on the stratigraphy and relative chronology of these burials, even though they lack absolute dates. In Goran Slatina/Mound III (Bulgaria) the following stratigraphic sequence was registered: the main grave (No. 9) with an individual lying crouched on the side, surrounded by a stone cromlech, was followed by two extended inhumations in oval pits (graves 6 and 7), and later on by graves of the Yamnaya culture (Kitov – Panayotov – Pavlov 1991, 62–74; Alexandrov 2011, 315). The same stratigraphic situation was recorded for grave 3 in Kalugeritsa/Mound III (Bulgaria) (Alexandrov 2011, 311). In Corlăteni (Romania), extended grave 2 was stratigraphically later than a Zhivotilovka-Volchansk grave (Gr.1)[5] with an individual crouched on the side, but earlier than graves with Yamnaya burial ritual (Comşa 1982; Manzura 2016, 57)[6].

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[3] Dates mentioned in the article are calibrated at 2σ, 95.4% probability.

[4] A similar feature was identified in the Püspökladány-Kincsesdomb kurgan, grave 2, but the chronological attribution of this grave is not clear (Dani – Horváth 2012, 34, 78–79, Fig. 16–17).

The number of ^{14}C dates of extended inhumations is rather limited. Results for the graves in Šajkaš, and Vităneşti indicate the very end of the 4th millennium BC and the beginning of the 3rd millennium BC. However, two ^{14}C dates were obtained for Grave 6 in Tiszavasvári-Deákhalom, with different results, one calibrated to 3090–2894 cal BC, but the other one covering the last third of the 4th millennium BC (3326–2926 cal BC), closer to the date from Sărăteni (3370–3090 cal BC) and the new date obtained for Aliman Gr.1/Mound 3 (3357–3101 cal BC) (*Table 4*).

Table 4. Radiocarbon dates of extended inhumations

Site/Grave	**Material dated**	**Lab ID**	**BP date**	**BC calibrated date (95.4% probability)**	**Literature**
Aliman T3/Gr.1	human bone	BRAMS-3569	4516±29	3357–3101	–
Sărăteni T.2/Gr.3	–	LU-2477	4530±40	3370–3090	Rassamakin 2013
Šajkaš, *Ciganska humka*/Gr.2	wood	Poz-88659	4320±60	3014–2889	Koledin *et al.* 2020
Šajkaš, *Ciganska humka*/Gr.2	wood	Poz-88659	4385±35	3075–2923	Koledin *et al.* 2020
Tiszavasvári-Deákhalom/Gr. 6	human bone	Poz-39209	4350±40	3090–2894	Horváth *et al.* 2013
Tiszavasvári-Deákhalom/Gr.6	human bone	Poz-40857	4430±30	3326–2926	Horváth *et al.* 2013
Vitănești, Mound I/ Gr. 3	human bone	DeA-12800	4256±30	2919–2761	Frînculeasa – Mirea – Trohani 2017

The next three phases are connected with the arrival and persistence of the Yamnaya burial ritual in the region for half a millennium. The main grave (Gr.2 - 3318–3239 (11.7%) 3173–3164 (0.8%) 3105–2921 (82.9%) cal BC) and a secondary grave added immediately after (Gr.4 - 3083–2916 cal BC) to mound 4 date from the end of the 4th and the beginning of the 3rd millennium BC. These features document the occurrence of the Yamnaya burial ritual with its typical characteristics: the supine position with raised knees of the individuals, ochre staining, orientation in the eastern or western sector. A circular enclosing ditch dug around the main grave (Gr.2) was identified, a practice attested in other mounds as well, in Dobroudja at Medgidia-Mound T3 (Schuster *et al.* 2011, 61–62, Fig. 18), but also east of the Prut at Balaban, Baştanovka, Glubokoe, Nerušaj, Ogorodnoe (Motzoi-Chicideanu 2011, 266, Pl. 97), Brânzenii Noi (Agulnikov – Mistreanu 2014, 50, Fig. 8), Cimişlia (Popovici *et al.* 2016, 20–21, Fig. 2, 3), Crihana Veche (Ciobanu – Agulnicov 2016, 46–47, Fig. 2–4). In Muntenia, in a mound excavated in Târgşoru Vechi, the ditch was dug aroung the main grave of a sub-adult individual (Frînculeasa 2019, 132). One has to mention that although not prevailing, double burials, in some cases containing adults and children, are not so uncommon and were documented south and north of the Lower Danube and east of the Tisza, such as Gr.3 from Mound 1 in Cimișlia; Gr.19 in Smeeni, Gr.5 in Chudomir, or Gr.7 in Sárrétudvary-Őrhalom (Gerling *et al.* 2012; Frînculeasa 2019; Alexandrov 2021).

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[5] Attribution made by F. Burtănescu (2002, 109), and I. Manzura (2016, 57).

[6] Several other extended inhumations that could be included in a more complex discussion do not provide reliable stratigraphic information or absolute dates so their contribution to clarifying the situation is limited. Such examples are Polsko Kosovo grave 1, Anadolchioi T1/Gr.1 to mention only two (for an extensive list see Alexandrov 2010 and Frînculeasa – Mirea – Trohani 2017).

The following period is marked by the secondary grave (Gr.2 - 3008–2987 (2.4%); 2931–2872 (91.2%); 2799–2782 (1.9%) cal BC) from mound 3, dated at the beginning of the 3rd millennium BC, and shows the continuation of the Yamnaya burial traditions. The latest Yamnaya phase in the Aliman mounds is roughly dated between 2850–2550 cal BC and is represented by two graves: Gr.1 from mound 4 (2878–2661 (89.5%) 2655–2631 (6.0%) cal BC), but also one flat grave (Gr.1/S) found in the proximity of the mounds (2859–2806 (20.6%) 2753–2721 (7.9%) 2703–2571 (64.3%) 2517–2500 (2.6%) cal BC). Both graves display a similar burial ritual, different from the previous phase, the individuals being laid on the back but tilted slightly to one side, either right or left, with one arm flexed and another one stretched along the body, towards the knees.

The final phase of mound use is documented by grave 3 from mound 4, for which a date of 1669–1608 cal BC was obtained, placing it in the Middle Bronze Age. The human osteological remains were severly disturbed by modern interventions and only the lower limbs of the individual were preserved *in situ*. From their position we can only infer that the individual was laid in crouched position on the left side.

The Aliman mounds in the wider landscape

The intensive research carried out in the past years in the wider steppe-like landscapes of Southeastern Europe has significantly altered our understanding of the chronology and characteristics of the tumular phenomenon. In Dobroudja (Tulcea and Constanța Counties), research conducted in the past 15 years in several mounds has significantly increased the archaeological and anthropological information available: Cernavodă – T7, T7a, T7b (Simalcsik – Simalcsik 2013), Medgidia – T3 (Schuster *et al.* 2011), Medgidia – T5, T6 (Vasile, unpublished anthropological report), Rahman – T1 (Ailincăi *et al.* 2014; Constantinescu – Soficaru 2013) and Rahman – T2 (Ailincăi *et al.* 2016). The different chronological phases identified in the two mounds researched in Aliman echoe results obtained for the other mounds excavated in Dobroudja, as well as regions north and south of the Lower Danube, south of the Balkans, east of the Tisza river, while opening up new interpretation possibilities.

The chronology of the funerary ritual of extended inhumations from the Eneolithic to the Bronze Age was thoroughly discussed in the past years, therefore below we will only briefly touch upon the time frame covered by the Aliman dates (Alexandrov 2010; 2011; Rassamakin 2013; Frînculeasa – Mirea – Trohani 2017; Włodarczak 2020).

The ^{14}C dates previously obtained for the extended inhumation in Vitănești, the grave in Šajkaš, and one date from Tiszavasvári-Deákhalom indicated the very end of the 4th millennium BC and the beginning of the 3rd millennium BC, which would make these features contemporary with early Yamnaya graves. Based on these results, it has been hypothesised that this group of extended inhumations corresponds to the horizon of expansion of Yamnaya communities to the west starting with 3100–3000 BC, or even that this ritual could have been one of the variants of the arrangement of burials used by the early Yamnaya communities (Włodarczak 2020, 142, 145). However, as already pointed out, a second date from Tiszavasvári-Deákhalom, the date from Sărăteni and the one from Aliman attest the existence of this ritual earlier, in the last third of the 4th millennium BC. The relationship with late 4th millennium BC graves assigned to what is called the pre-Yamnaya phase and to the Zhivotilovka-Volchansk phenomenon, usually with individuals crouched on the side, needs to be further explored, but at least in terms of absolute chronology they are contemporary (Frînculeasa – Mirea – Trohani 2017, 87; Fig. 1; Dani 2020; Frînculeasa 2021a, 175 ff.). In northern Moldova a horizon of extended inhumations that are stratigraphically later than Zhivotilovka-Volchansk was documented (Manzura 2016, 57; Włodarczak 2020).

Overall, from the available absolute dates, we can clearly distinguish a group of extended inhumations in mounds, in oval or rectangular pits arranged with wooden beams, covering the last third of the 4th millennium BC and the beginning of the 3rd millennium BC, contemporary with the pre-Yamnaya and early Yamnaya phase. Stratigraphically, these graves seem to be placed in between Zhivotilovka-Volchansk/pre-Yamnaya burials and early Yamnaya ones, but further research and more secure contexts are required. The chronological/stratigraphic and also cultural relationship between these different funerary traditions with steppe origins (crouched, extended and supine postures of the individuals) intersecting at the western end of the Great Steppe Belt between 3300–2900 BC is still open for exploration. There are also indications that the funerary ritual of extended inhumations was preserved during the later Yamnaya phases as well, if only isolatedly. This is supported by grave 1 from Zeglartsi mound 2, a secondary grave with an extended individual and a ^{14}C date around 2800–2600 cal BC (Alexandrov 2021, Fig. 18/2; Pl. 2)[7]. However, this idea was rejected by some scholars and would indeed need more evidence to support it (Rassamakin 2013).

The next three phases fall within the chronology and ritual practices established in the past years for the Yamnaya phenomenon in its western distribution area. The earliest occurrence of the typical Yamnaya burial ritual is dated to the last century of the 4th millennium BC and the first century of the next one, as shown by graves 2[8] and 4 from Aliman/Mound 4. Similar intervals were obtained for tumular burials in other regions of Romania (Frînculeasa 2021a), Bulgaria (Kaiser – Winger 2015; Alexandrov 2021, Pl. 2)[9], and Hungary (Horváth *et al.* 2013). The burial ritual becomes highly standardised, the individuals are now laid in rectangular pits with rounded corners, in supine position with their knees initially raised and arms along the body, with the head oriented westwards or eastwards, often sprinkled with red ochre, or ochre lumps were placed on the pit bottom; the pits were covered with wooden beams and mats made of vegetal textiles (Preda-Bălănică – Frînculeasa – Heyd 2020, 87).

The next interval, represented by the secondary double grave (Gr.2) from mound 3 and dated in the first centuries of the 3rd millennium BC, shows the continuation of the previous phase and, through the presence of a jug with a raised handle as a grave good, the incorporation of local pottery into the burial ritual of communities raising mounds. This practice was noticed throughout the western Yamnaya area and suggests interactions between steppe and local elements (Alexandrov 2021; Frînculeasa 2021a). The latest Yamnaya phase in the Aliman mounds is dated between 2850–2550 BC and represented by two graves: Gr.1 from mound 4, and one flat grave (Gr.1/S) found in the proximity of the mounds. This phase highlights a change in burial practices, from the supine posture to individuals laid slightly tilted to one side, with flexed legs, one arm stretched out to the knees and the other one bent. This change, supported by both stratigraphic information and absolute dates, has been confirmed in other mounds in Dobroudja (Ailincăi *et al.* 2016), Muntenia (Frînculeasa *et al.* 2017), but also between the Prut and the Dniester where this posture is considered specific to the Budzhak (later) phase of the Yamnaya culture (Dergachev 2021).

The last grave (Gr.3) was added to mound 4 in the 2nd millennium BC. Recent research highlights the possibility that secondary graves in burial mounds, most often attributed to the Yamnaya phase, might actually belong to the Middle Bronze Age and mark the persistence of north-west-Pontic elements (Frînculeasa 2020).

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[7] Grave no. 2 in mound III from Goran Slatina also seems to be stratigraphically contemporary to Yamnaya graves in the same mound, but no absolute dates are available (Kitov – Panayotov – Pavlov 1991, 66, fig. 40; Alexandrov 2010, 280). Other graves that could be dated to the 3rd millennium BC are graves 4 and 13 from Goran Slatina (Kitov – Panayotov – Pavlov 1991, 58–59, fig. 33–34).

[8] Although this date gave an overall larger interval, the most significant part of it falls between 3105–2921 cal BC (82.9% probability).

[9] The absolute chronology of the earliest Yamnaya graves is still a debated topic (Alexandrov 2021, 309; Anthony 2021; Frînculeasa 2021b, note 50).

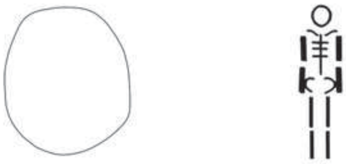
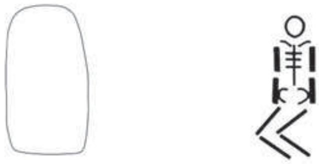
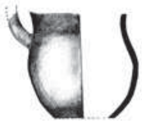
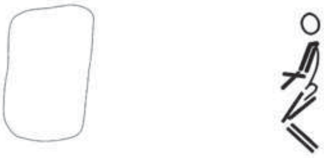
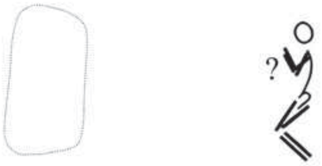
pre-Yamnaya	≈3300-3100 BC	 ochre no grave goods
Yamnaya	≈3100-2850 BC	 ochre 
	≈2850-2500 BC	 ochre no grave goods
Middle Bronze Age	≈1700-1600 BC	 no ochre no grave goods

Fig. 5. Overview of the chronological phases and burial practices in Aliman mounds

The burial practices documented in Aliman, analysed through the perspective of stratigraphy and absolute chronology (*Fig. 5*), offer a glimpse into the long lasting world of funerary mounds in Dobroudja and the wider steppe landscapes of Southeastern Europe, more precisely into a period of one and a half millennia, from the last third of the 4th millennium BC to the first half of the 2nd millennium BC. However, in terms of chronology and elements of the burial ritual these discoveries find analogies not only in burial mounds but also discoveries of isolated flat graves or necropolises contemporary to burial mounds. Although the latter are not particularly rare, the relationship between flat and tumulary burials is currently underexplored due to their poor publication and general lack of absolute dates. More information comes from a necropolis recently investigated in Jijila (AILINCĂI *et al.* 2021). Several graves covering a period from the end of the 4th millennium BC to the 2nd millennium BC were researched, showing similarities of the burial ritual such as the shapes of grave pits, the posture of the dead, and the use of ochre, but in the absence of a burial mound. New research is starting to fill in the gaps and offer a more complex understanding of the life of communities in the region during the Bronze Age.

Acknowledgements

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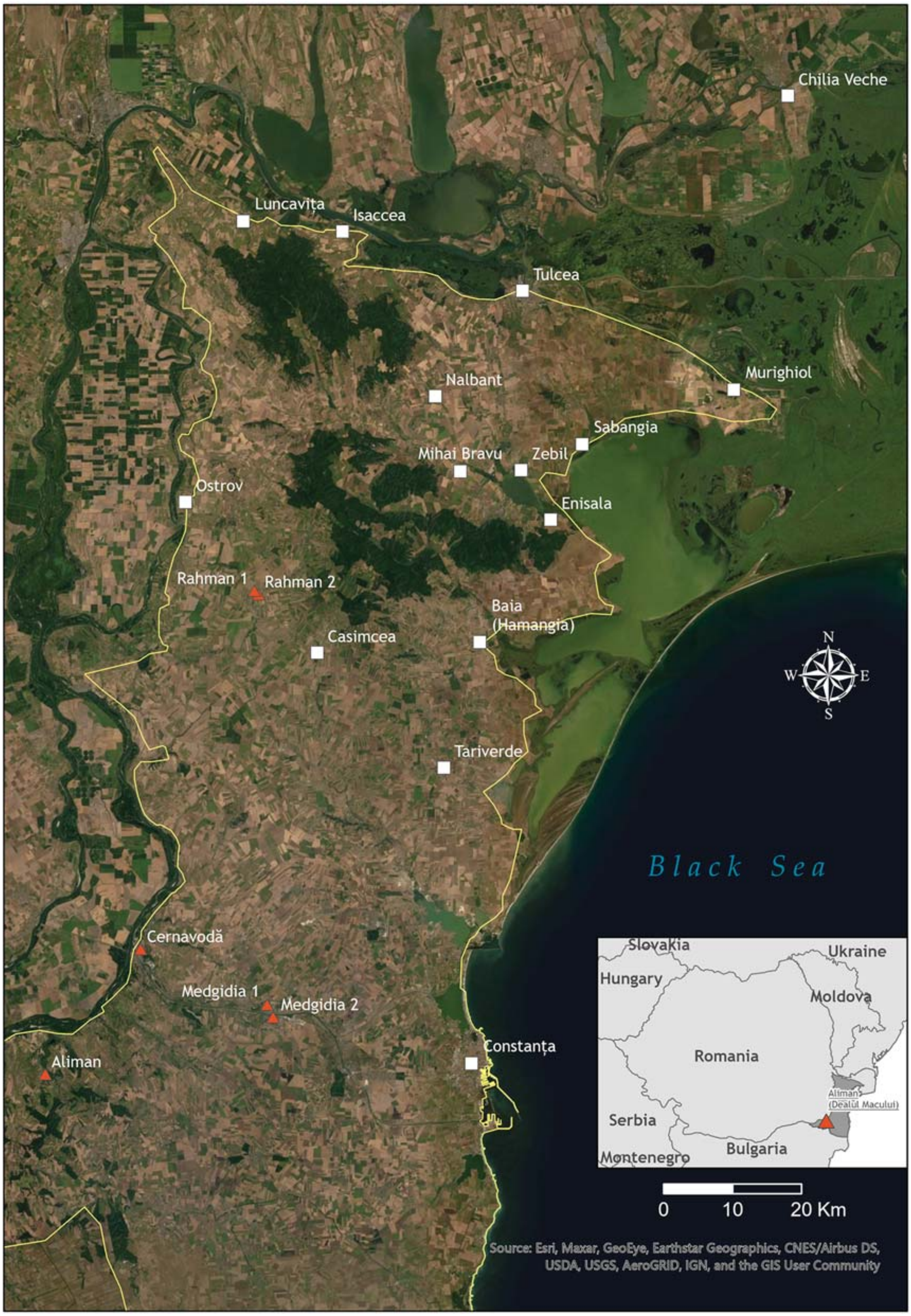
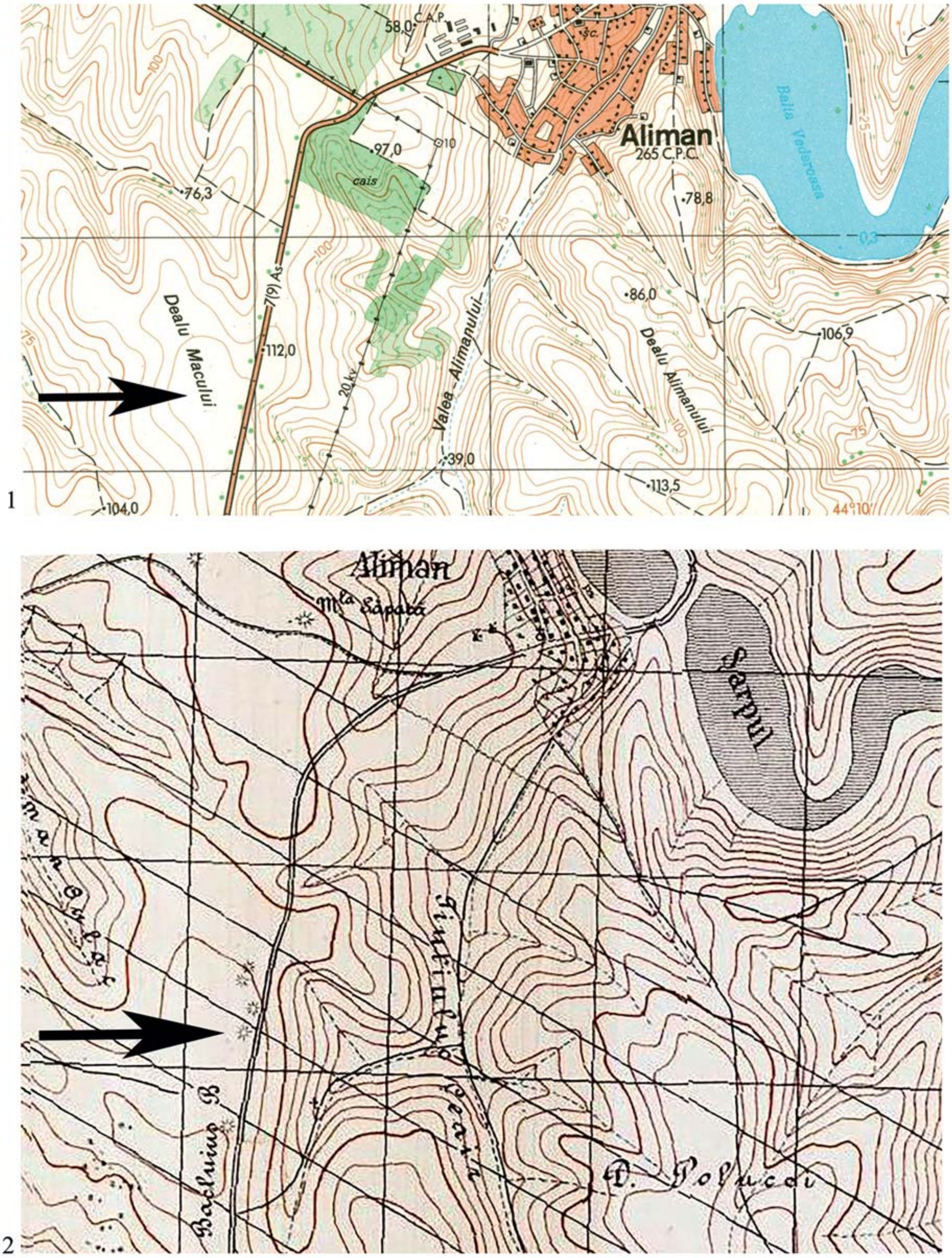
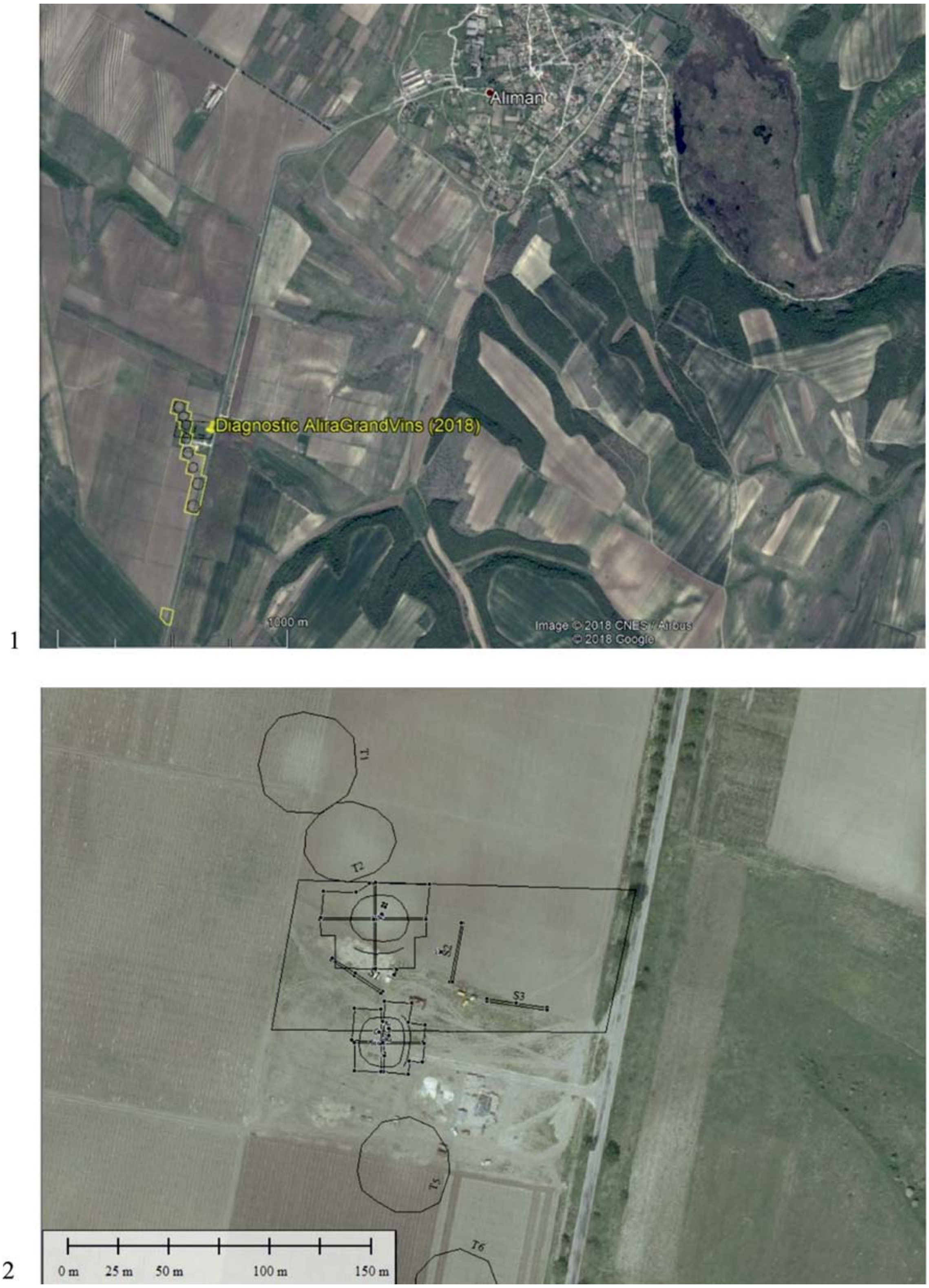


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

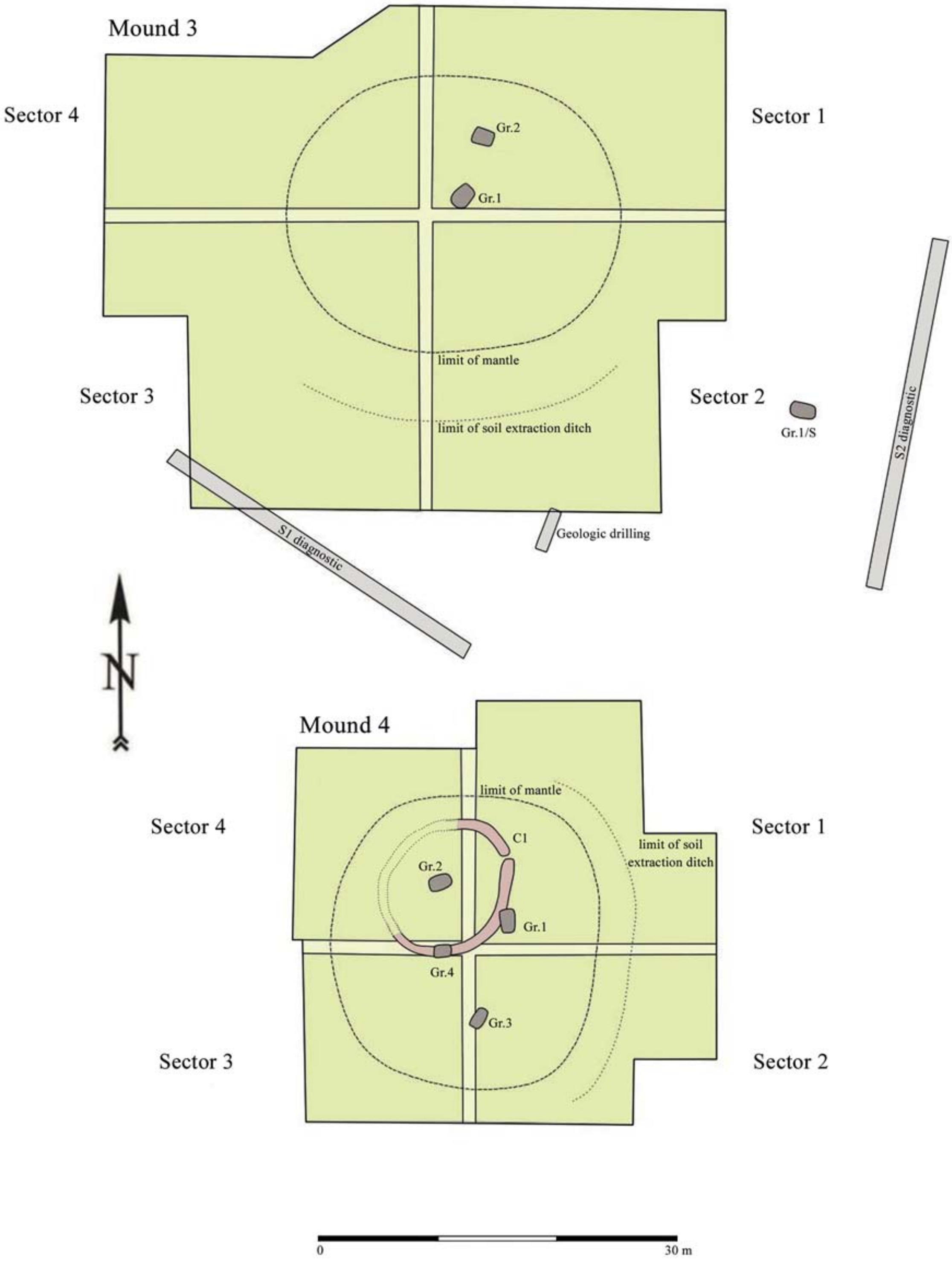
Pl. 1. Map of the Yamnaya mounds from Dobroudja: excavated (white squares) and with anthropological analyses (red triangles) (map Bogdan Olariu)



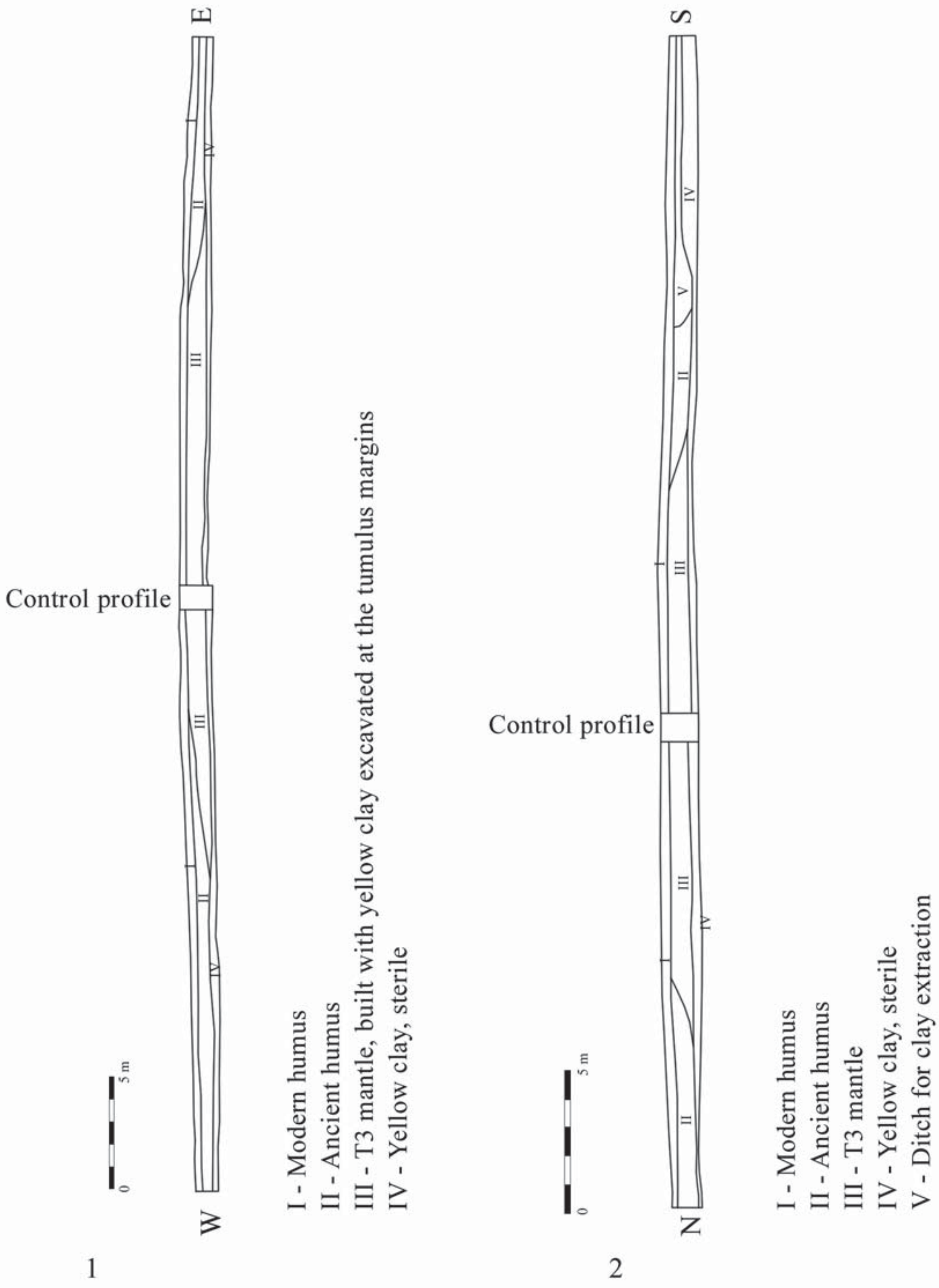
Pl. 2. 1. The topographic position of Aliman-Dealul Macului on a map of Department of Military Topography (Sc. 1:25.000) 2. Five of the Aliman mounds on Artillery Firing Plans (Sc. 1:20.000)



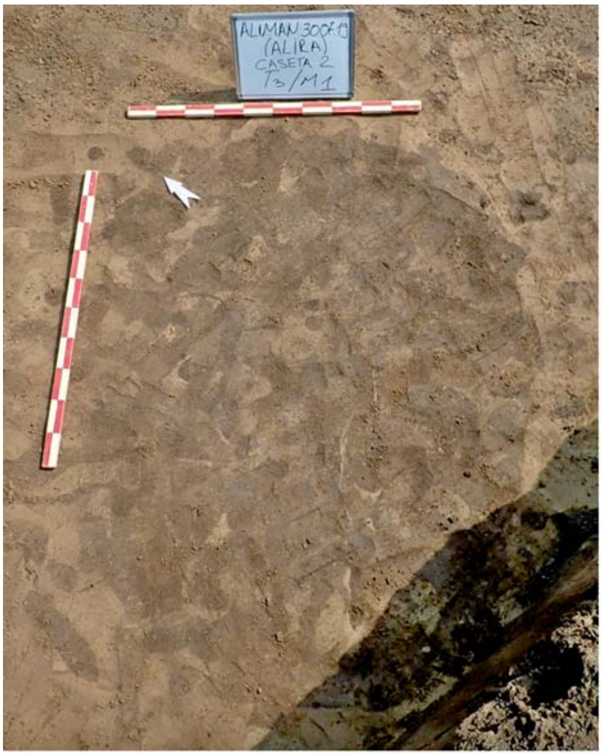
Pl. 3. 1. The eight mounds row from Aliman-Dealul Macului on an ortophotomap; 2. Detail with Mounds 3 and 4



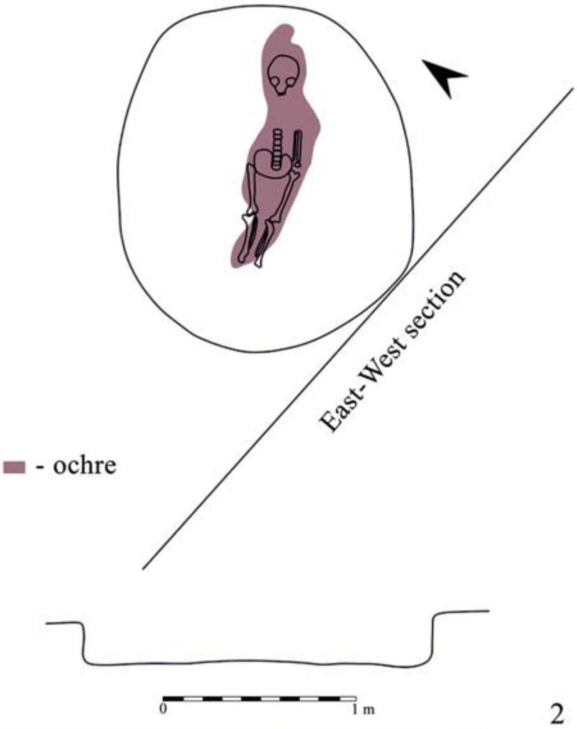
Pl. 4. The general excavation plan of Mounds 3 and 4


1
E
W
Control profile
I
II
III
IV
5 m
0
I - Modern humus
II - Ancient humus
III - T3 mantle, built with yellow clay excavated at the tumulus margins
IV - Yellow clay, sterile
2
S
N
Control profile
I
II
III
IV
V
5 m
0
I - Modern humus
II - Ancient humus
III - T3 mantle
IV - Yellow clay, sterile
V - Ditch for clay extraction

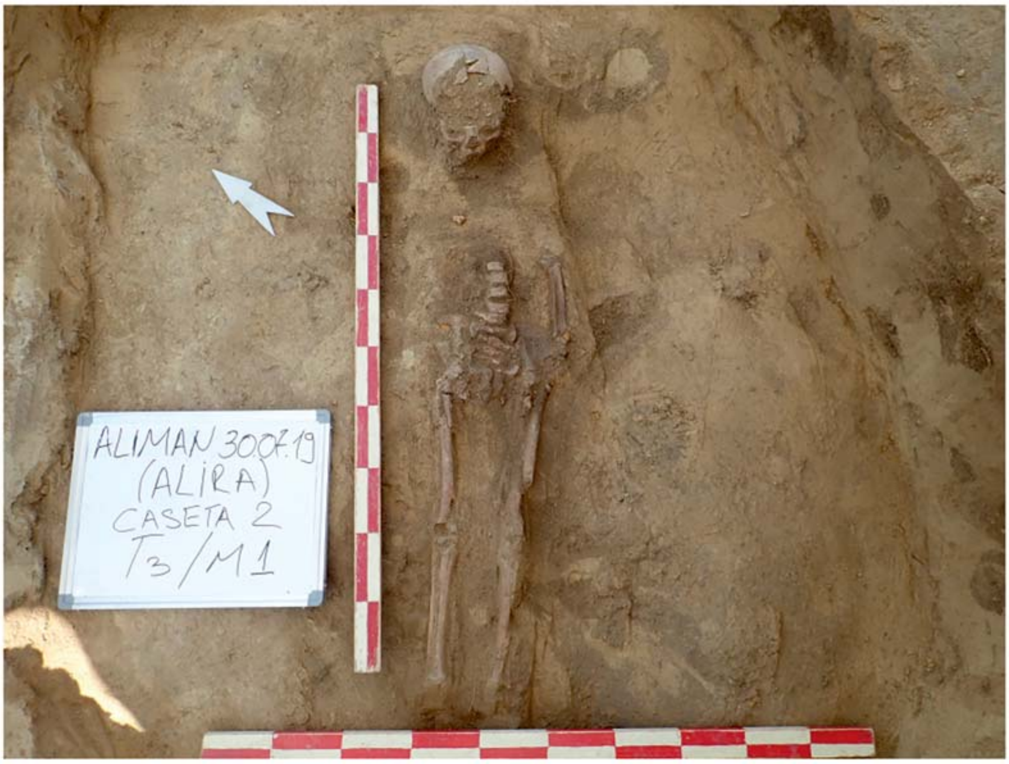
Pl. 5. Stratigraphic outliers of Mound 3 (N-S and E-W)



1

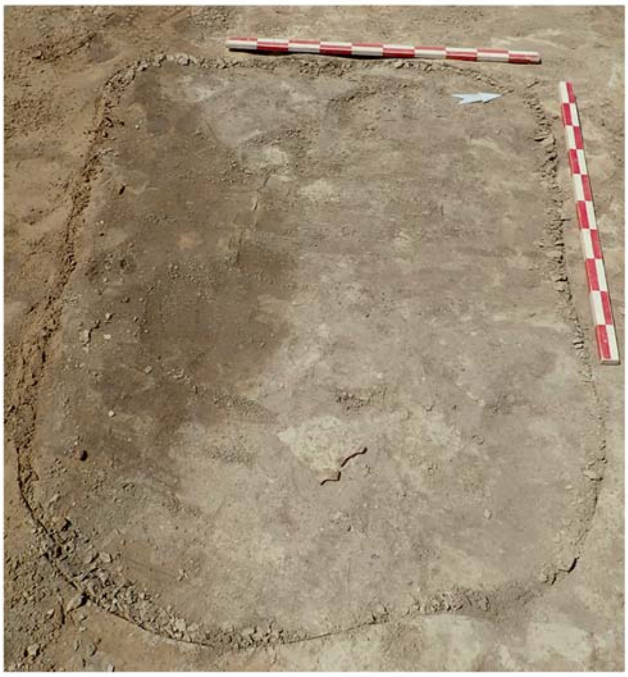


2

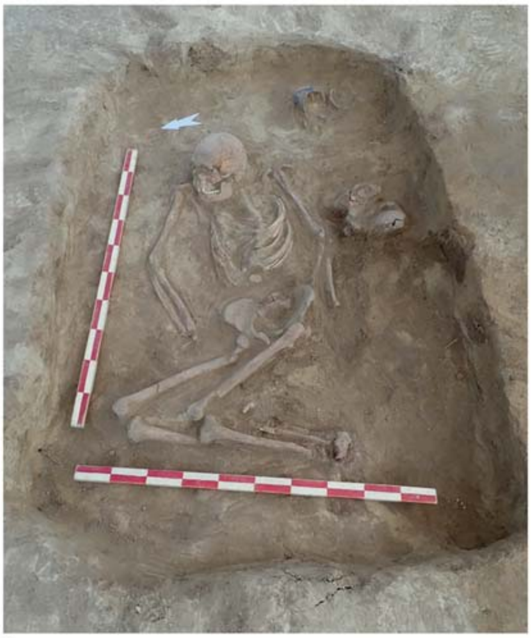


3

Pl. 6. Grave 1 from Mound 3: the outline of the grave pit (1), drawing and photo of grave 1 (2–3)



1



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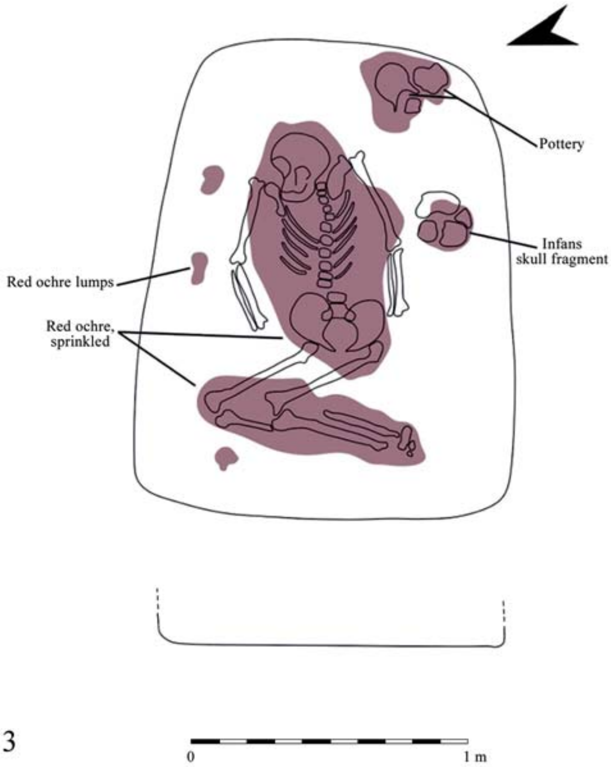

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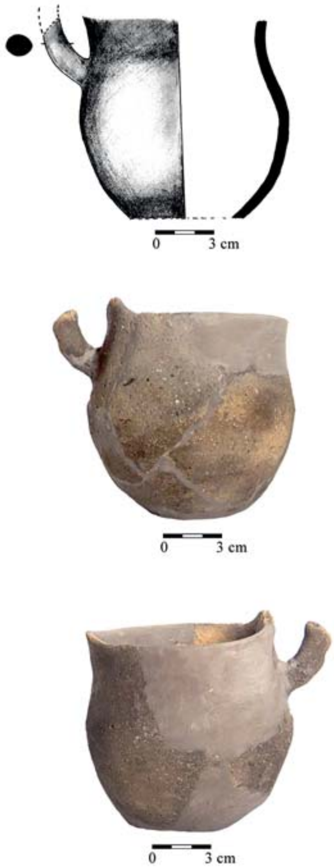
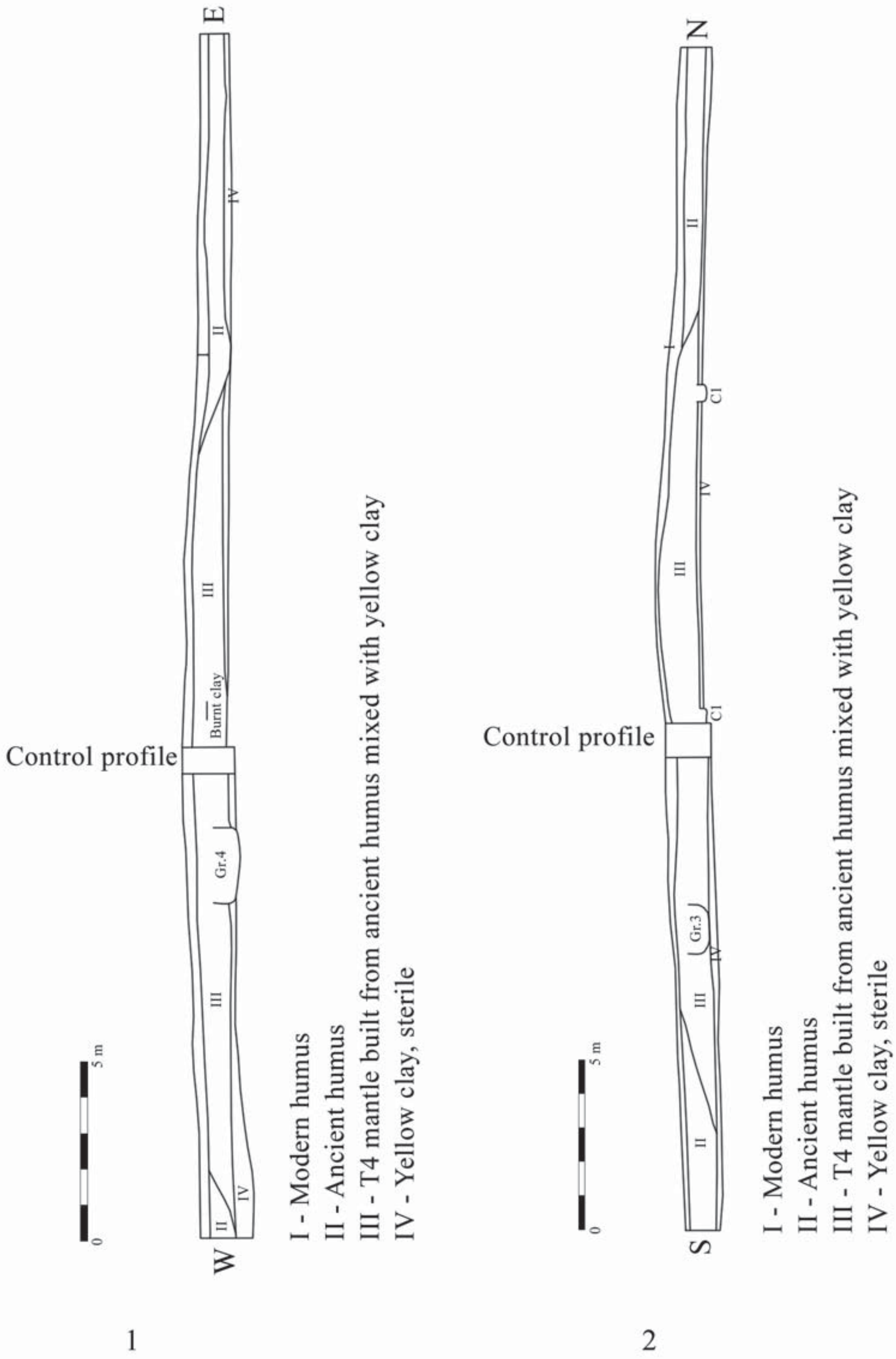
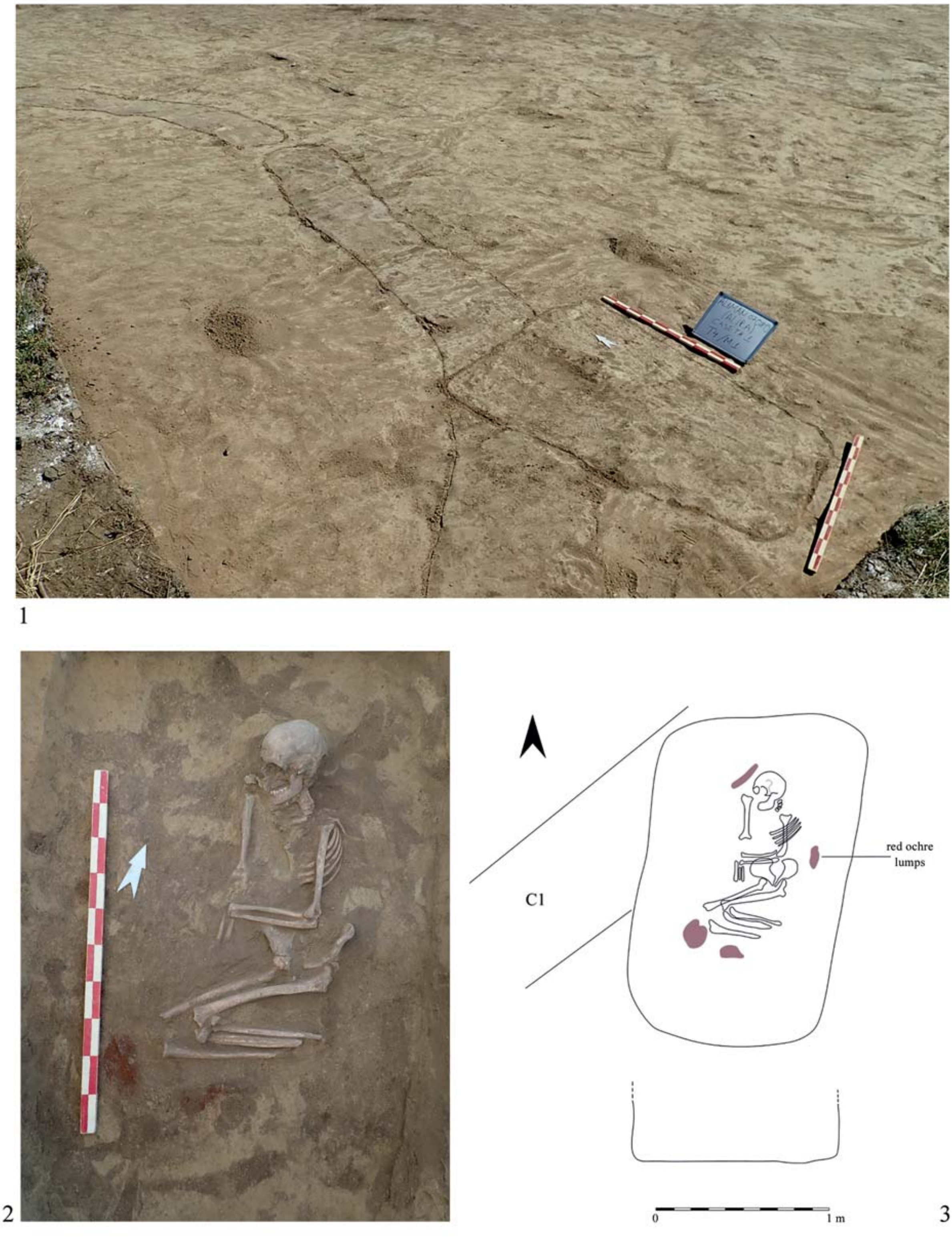


4

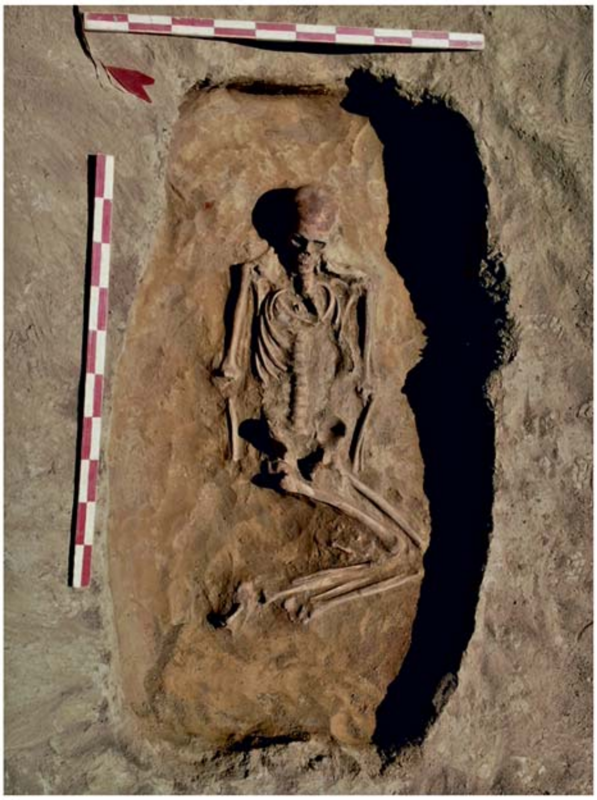
Pl. 7. Grave 2 from Mound 3: the outline of the grave pit (1), photos and drawing of grave 2 (2–3), drawing and photo of the pot found in the grave (4)


E
W
Control profile
Burnt clay
Gr.4
I
II
III
IV
0
5 m
I - Modern humus
II - Ancient humus
III - T4 mantle built from ancient humus mixed with yellow clay
IV - Yellow clay, sterile
1
N
S
C1
Gr.3
2

Pl. 8. Stratigraphic outliers of Mound 4 (N-S and E-W)

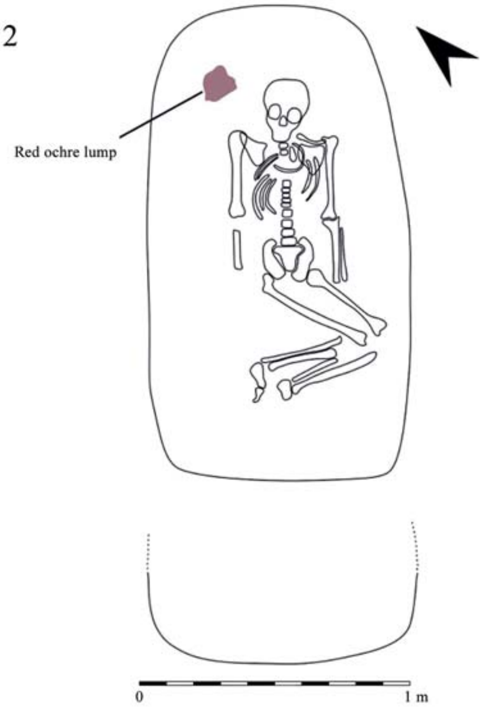


Pl. 9. Grave 1 from Mound 4: the outline of the grave pit and C1 ditch (1), photo and drawing of grave 1 (2–3)



1

2



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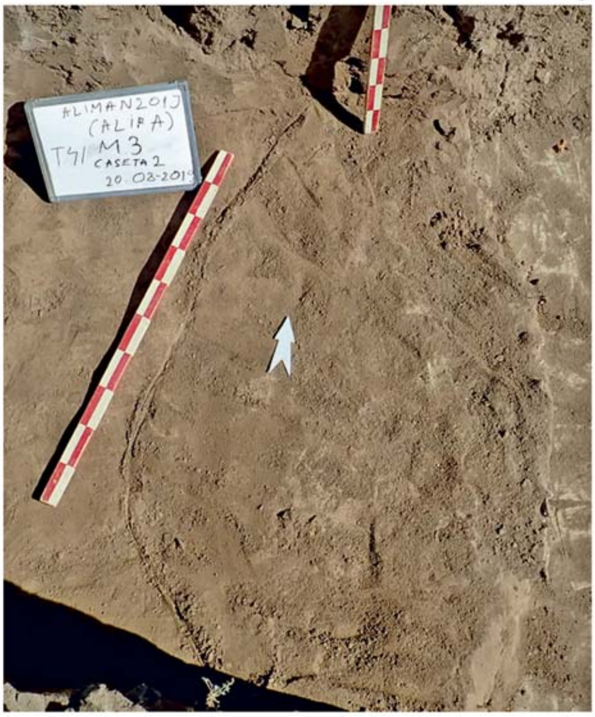

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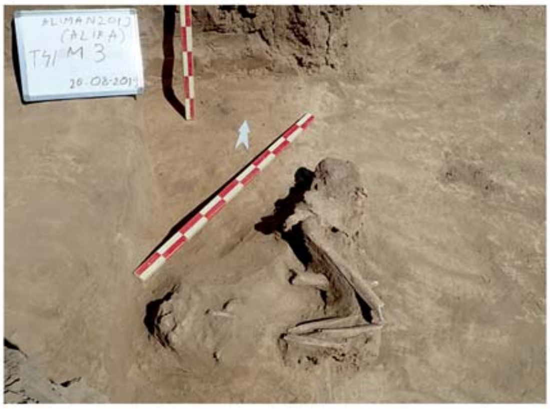

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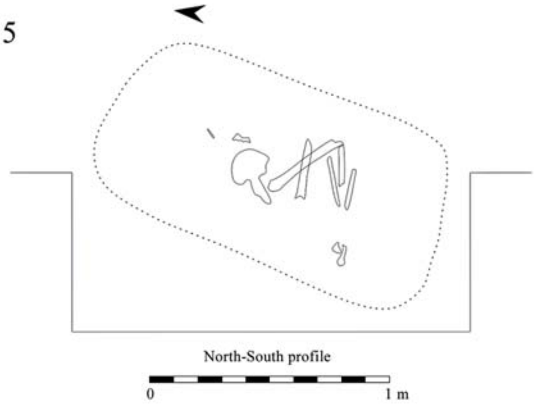
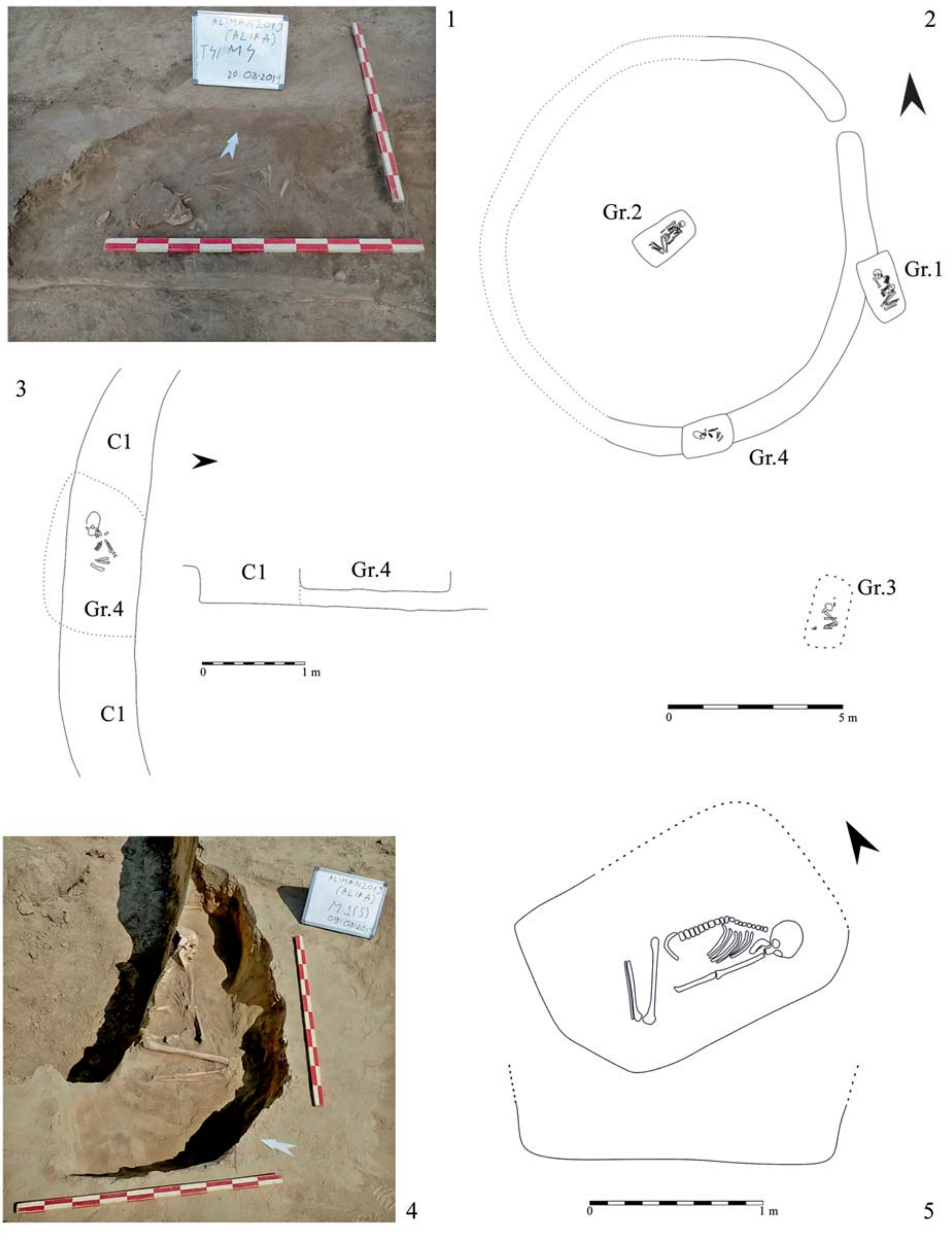


Pl. 10. Grave 2 from Mound 4: photos and drawing (1–2); Grave 3 from Mound 4: the outline of the grave pit (3), photos and drawing of grave 3 (4–5)



Pl. 11. Grave 4 from Mound 4: photo and drawing (1, 3); detail of Mound 4 with the enclosing ditch (2); the grave from survey (Gr.1/S), photo and drawing (4–5)

of the skeletal material, Ingrid Petcu-Levei (National History and Archaeology Museum, Constanţa) for drawing the vessel, and Bogdan Olariu for creating the map illustrated in Plate 1. The authors would like to express their deepest appreciation to Dr. Constantin Băjenaru, the scientific coordinator of the excavation, for kindly allowing us to publish archaeological material from Aliman.

Supplementary information

Supplementary Table 1. Bilateral dimensions (L/R, in mm) and indices, cranial and postcranial, in individuals from Aliman Alira

Martin nr.	**T3/Gr.1**	**T3/Gr.2, I1**	**T4/Gr.1**	**T4/Gr.2**	**T4/Gr.3**	**T4/Gr.4**	**Gr.1/S**
1		191.2	181.1	169.0			
8		143.9	130.1	138.8			137.1
I1		75.3	71.8	82.1			
17				126.1			
20		120.3					
I2				74.6			
I3				90.8			
I4		62.9					
I5		83.6					
9	92.1	100.4		99.4			106.4
10	106.2	116.4	116.2	114.5			118.4
I12	86.7	86.3		86.9			89.9
I13		69.8		71.6			77.6
26	110.0	136.0	117.0	122.0			131.0
29	100.3	123.6	105.4	103.8			113.6
I22	91.1	90.9	90.1	85.0			86.7
27		136.0	124.0	128.0			
30		119.3	112.2	110.1			
I24		87.7	90.5	86.0			
12		111.8	103.9	113.3			
I14		77.7	79.9	81.6			
45		131.5					
46						80.2	
51	31.6/32.6	41.47/-	34.84/-	35.8/35.7			39.5/39.7
52				29.7/29.5			
I42				83.0/82.5			
54				24.1		20.3	
55				51.1			
I48				47.1			
60				52.7			
61				59.8		51.5	
I54				113.5			

Martin nr.	**T3/Gr.1**	**T3/Gr.2, I1**	**T4/Gr.1**	**T4/Gr.2**	**T4/Gr.3**	**T4/Gr.4**	**Gr.1/S**
62				36.8			
63				35.0		30.0	
64		13.82/-	-/10.9	9.4/9.6			-/13.2
I58				95.0			
I59				26.8/27.4			
5				116.2			
40				113.5			
I60				97.7			
65		119.0	100.1	112.3			124.1
66		119.0	85.3	98.3			107.1
68		107.4	95.8	98.1			111.9
I62		90.3	95.6	87.4			90.2
80(2)		44.0/44.0					50.9/50.9
C1		141.7/-					167.7/-
C6		40.0/-					38.0/-
C6:C1		28.2/-					22.7/-
H1		325.1/329.2		315.7/312.5			349.1/-
H2		316.5/322.1		311.4/309.4			344.2/-
H5		24.8/25.2		20.3/21.5			22.02/-
H6		19.3/19.7		17.8/16.6			17.5/-
H6:H5		77.8/78.3		87.6/77.0			79.2/-
R1		248.9/248.9	208.3/-				266.1/-
U1	149.9/-		242.4/-				
U13	12.7/-	23.9/23.7	19.9/-	19.9/-			20.5/-
U14	14.6/-	24.1/23.9	22.8/-	20.1/-			23.8/-
U13:U14	86.6/-	99.0/99.4	87.4/-	99.0/-			85.9/-
S2		106.6					
S5		110.7			130.0		
S5:S2		103.9					
F1	242.5/-	-/447.6	389.3/-	-/385.4			501.8/500.0
F2		-/445.6					500.1/493.8
F6	15.1/-	-/30.9	27.8/-	-/26.7			30.8/27.0
F7	15.3/-	-/28.3	21.6/-	-/25.0			26.8/28.8
F9	22.7/-	-/33.3	30.2/30.4	33.0/34.6	-/35.4		33.6/37.1
F10	18.3/-	-/28.8	25.3/25.7	25.2/24.8	-/28.5		32.3/29.0
F19		45.7/45.8			-/49.2		50.1/49.7
F21		-/79.8	66.0/-				84.6/86.5
F6:F7	98.7/-	-/109.1	128.7/-	-/106.6			114.9/93.9
F10:F9	80.6/-	-/86.4	83.7/84.5	76.4/71.7	-/80.4		96.2/78.2
P2			41.0/-				
T1a	203.5/-						
T1b	204.9/-						

Martin nr.	T3/Gr.1	T3/Gr.2, I1	T4/Gr.1	T4/Gr.2	T4/Gr.3	T4/Gr.4	Gr.1/S
T8	18.1/18.2						
T8a	19.6/19.8	38.1/38.3	32.3/33.1		-/38.9		39.7/39.3
T9a	15.2/14.4	25.8/25.8	21.8/21.6		-/28.8		23.2/23.5
T9a:T8a	77.6/72.5	67.6/67.4	67.6/65.3		-/74.1		58.5/59.9
C1:H2		44.8/-					48.7/-
R1:H2		78.6/77.3					77.3/-
R2:F21			62.2/-				

Supplementary Table 2. The bilateral entheses considered in the present study and the degree of development of enthesophytes (x = unobservable; 1 = weak expression; 2 = moderate expression; 3 = well defined entesophytes)

Enthesis		T3/Gr.2, I1	T4/Gr.3	Gr.1/S
Clavicle	*L. costoclaviculare*	3/3	x/x	1/x
	L. conoideum	1/x	x/x	2/x
	L. trapezoideum	1/x	x/x	1/x
	M. pectoralis major	2/2	x/x	2/x
	M. deltoideus	1/x	x/x	1/x
Scapula	*M. teres minor*	1/1	x/x	3/x
	M. triceps brachii	1/1	x/x	3/x
Humerus	*M. pectoralis major*	2/2	x/x	2/x
	M. latissimus dorsi, m. teres major	3/3	x/x	3/x
	M. deltoideus	3/3	x/x	2/x
	M. brachioradialis	2/2	x/x	2/x
Radius	*M. biceps brachii*	1/1	x/x	3/x
	M. pronator teres	1/1	x/x	2/x
	Membrana interossea antebrachii	1/1	x/x	1/x
Ulna	*M. triceps brachii*	1/1	x/x	2/x
	M. brachialis	2/2	x/x	2/x
	M. supinator	1/1	x/x	2/x
Femur	*Trochanter major*	1/1	x/1	x/2
	M. iliopsoas	1/1	x/2	2/2
	M. gluteus maximus	1/1	x/2	2/2
	M. vastus medialis	1/1	x/1	2/2
	Linea aspera	1/1	x/2	2/2
Patella	*T. quadriceps*	x/x	x/x	x/x
Tibia	*L. patellae*	1/1	x/x	2/2
	M. soleus	1/2	x/x	3/3
Talus	*Calcaneal tendon*	1/x	x/2	3/3
	T. abductor hallucis, t. flexor digitorum brevis	x/x	x/x	x/x

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More about a particular group of Early Bronze Age barrow graves in Hocker position from North-East Bulgaria

STEFAN ALEXANDROV

Abstract

Eleven Early Bronze Age barrow graves from North-East Bulgaria – relaxed hocker inhumations with arms bent at the elbows, both palms in front of the head/torso – are discussed. They were primary graves for their respective barrows (relatively small in size), stratigraphically followed by inhumations in supine position with flexed legs that are related to Yamna populations. Ten of eleven graves were single graves, buried were persons of both sexes and all ages, with the orientation of the body following the west-east axis. Red ochre and grave inventory are relatively well represented in the graves as well. According to six radiocarbon dates, their chronological position is secured to 3400/3300–2900 cal BC period.

Similar grave assemblages are to be found in North Dobroudja, Muntenia (Prahova region), Central-North and North-West Bulgaria (Goran-Slatina, Tarnak, Tarnava) and Upper Thrace (Boyanovo). The westernmost grave of that group was found in Sárrétudvari-Őrhalom (Hungary). In the North-Pontic region, such graves were included in the "Zhivotilovka-Volchanskoe-Bursuceni" group and considered to be in the same chronological and stratigraphic position as the ones discussed here.

For 3400/3300–3100 cal BC relaxed hocker graves in North-East Bulgaria a possible relation to the Cernavodă III and Usatovo phenomena is argued. The post-3100 BC relaxed hocker graves are considered to be related to local populations as well.

***Key words**: 4th – 3rd millennia BC, barrow graves, Lower Danube region, North-Pontic region, Cernavodă III, Usatovo, Zhivotilovka graves, Yamna graves*

Introduction

During the last decades, the number of Early Bronze Age (EBA) barrow graves investigated in the eastern part of the Northern Balkans has rapidly grown. In North Bulgaria only, their number reached 200. Those graves presented a large variety of mortuary practices, most of all considering the position of the body in the grave – extended, supine with flexed legs, semi-supine with flexed legs, different crouched/hocker positions, or only parts of the body were buried. Additionally, more than one third of the graves in discussion has been dated by radiocarbon samples showing chronological/spatial coexistence of different body positions in different micro-regions.

On the other hand, in Muntenia and the North-Pontic regions groups of barrow graves with inhumations in crouched/hocker positions have been identified, dated prior to 3100/3000 BC period i.e. belonging to pre-Yamna populations. While in Muntenia (Prahova region) those graves were related to local Baden/Coţofeni groups (Frînculeasa 2020a), in the North-Pontic area they were interpreted as belonging to the "Zhivotilovka-Volchanskoe-Bursuceni" group. The nature of the appearance and development of this group is still uncertain, with different approaches being applied for analysing the

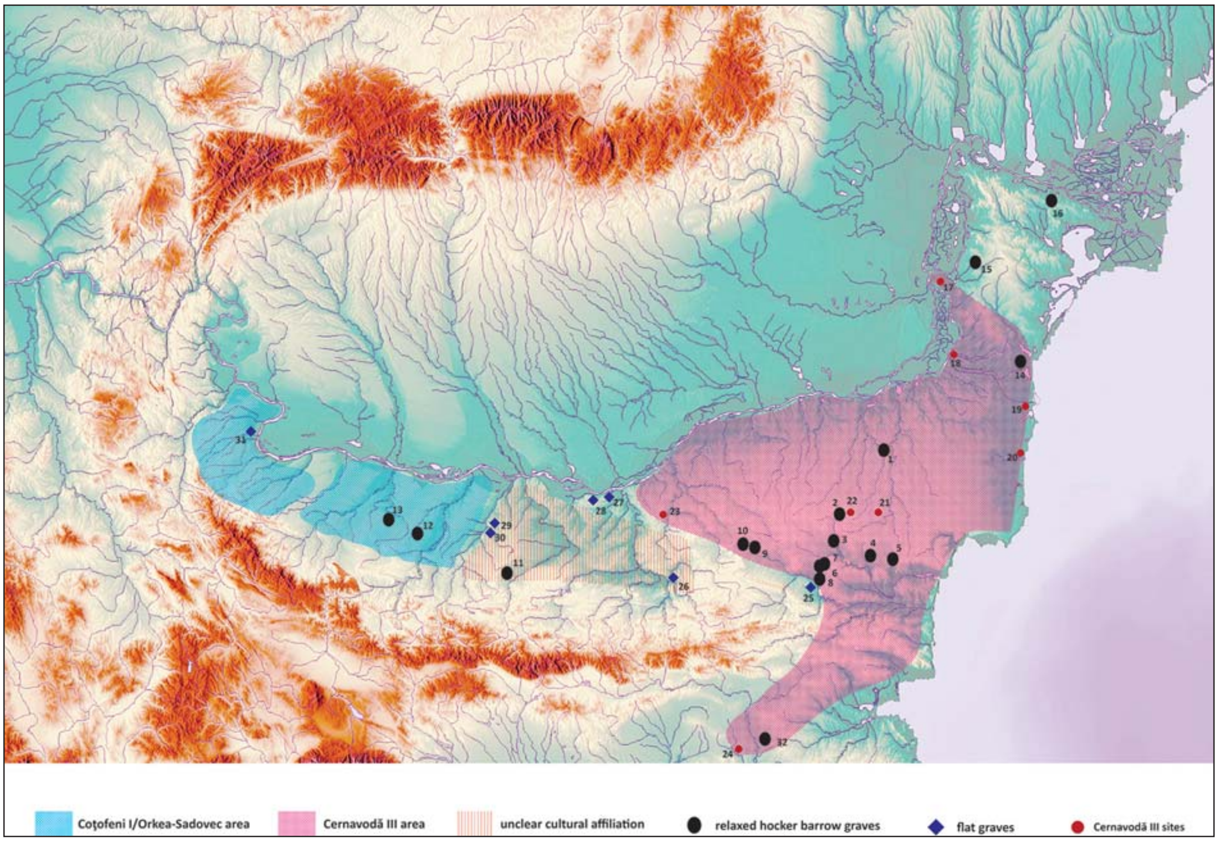

Fig. 1. Sites mentioned in text. 1. Kamentsi, 2. Pet mogili, 3. Vetrino, 4. Belogradets, 5. Pliska, 6. Kalugeritsa, 7. Madara, 8. Kiulevcha, 9. Ralitsa, 10. Chudomir, 11. Goran-Slatina, 12. Tarnak, 13. Tarnava, 14. Anadolkioi, 15. Rahmani, 16. Tulcea, 17. Hârşova, 18. Cernavodă, 19. Tuzla, 20. Durankulak, 21. Brestak, 22. Mirovtsi, 23. Koprivets, 24. Drama, 25. Smyadovo, 26. Dzhulyunitsa, 27. Batin, 28. Svishtov, 29. Telish-Laga, 30. Ezero-Kaleto, 31. Tarnyane, 32. Boyanovo

problem (most recently in Rassamakin 2021). Such graves are known from North Bulgaria and, even from Thrace as well. Their presence is of particular interest considering the fact that they appear in the same micro-regions or in barrows in which Yamna graves were found as well. The present analysis will focus on the northeastern lot of Bulgarian graves – the most numerous one, also providing more reliable information.

The graves in discussion form a particular group – relaxed hocker inhumations with arms bent at the elbows, both palms in front of the head or one of them in front of the torso. The group from North-East Bulgaria comprises 11 barrow graves as follows (*Fig. 1*): Kamentsi – barrow 1, grave 5 (*Fig. 2.1*); Pet mogili – barrow 3, grave 4 (*Fig. 3.3–4*); Vetrino 2 – barrow 7, grave 1 (*Fig. 3.2*); Belogradets – barrow 3, grave 2 (*Fig. 2.6*); Pliska-West – barrow 27, grave 1 (*Fig. 3.1*); Kalugeritsa – barrow III, grave 4; Madara – barrow 2, grave 2 and barrow 4, grave 4; Kiulevcha – barrow I, grave 3; Ralitsa – barrow 1, feature 1 (*Fig. 2.7*) and Chudomir – barrow 1, feature 17 (*Fig. 2.3–5*).[1]

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[1] All the data and references regarding the respective graves are presented in the Catalogue at the end of the text.

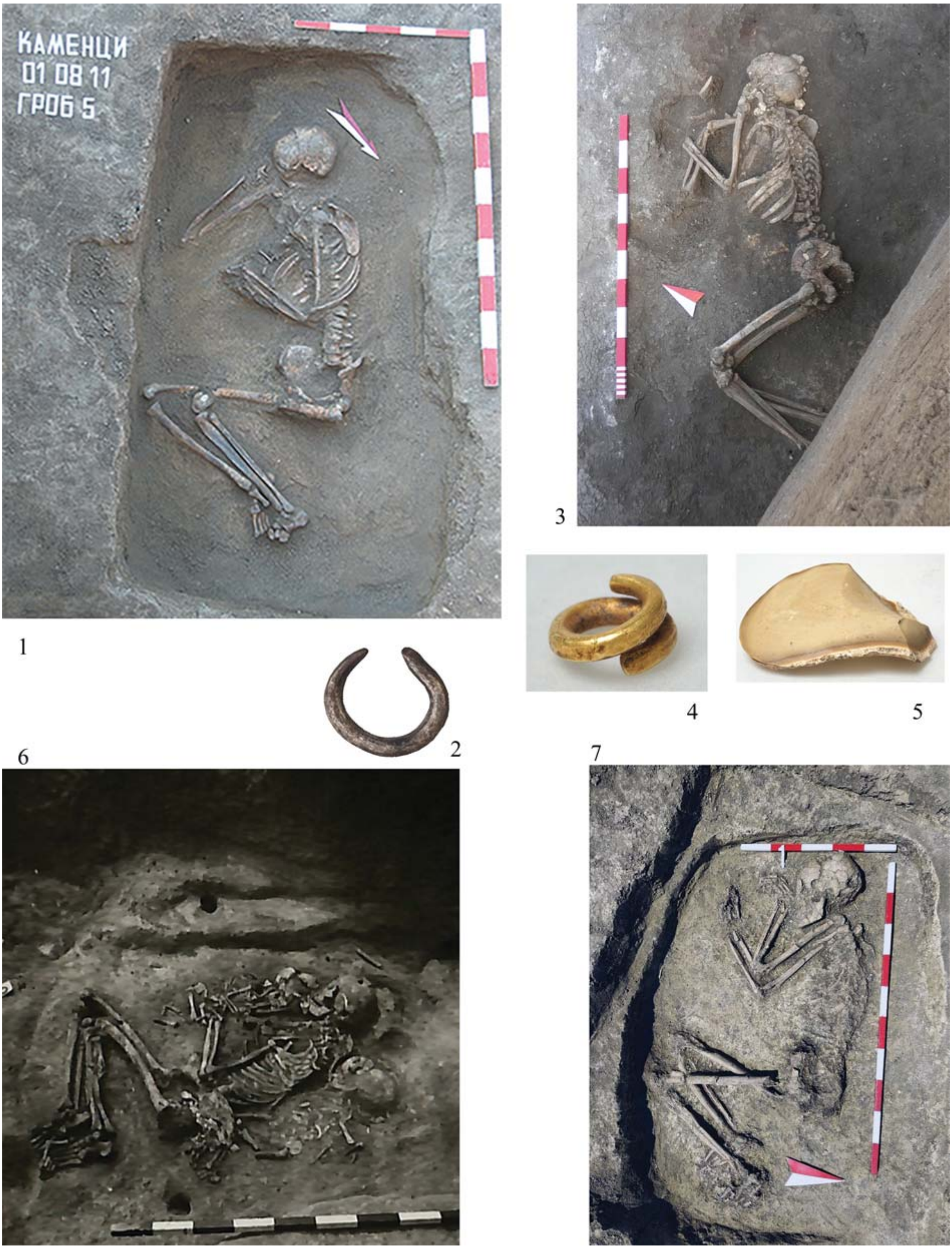

Fig. 2. Relaxed hocker graves from Northeast Bulgaria. 1. Kamentsi necropolis, barrow 1, grave 5, 2. Silver hair ring from Kalugeritsa necropolis, barrow III, grave 4, 3–5. Chudomir, barrow 1, feature 17, 6. Belogradets necropolis, barrow 3, grave 2, 7. Ralitsa, barrow 1, feature 1

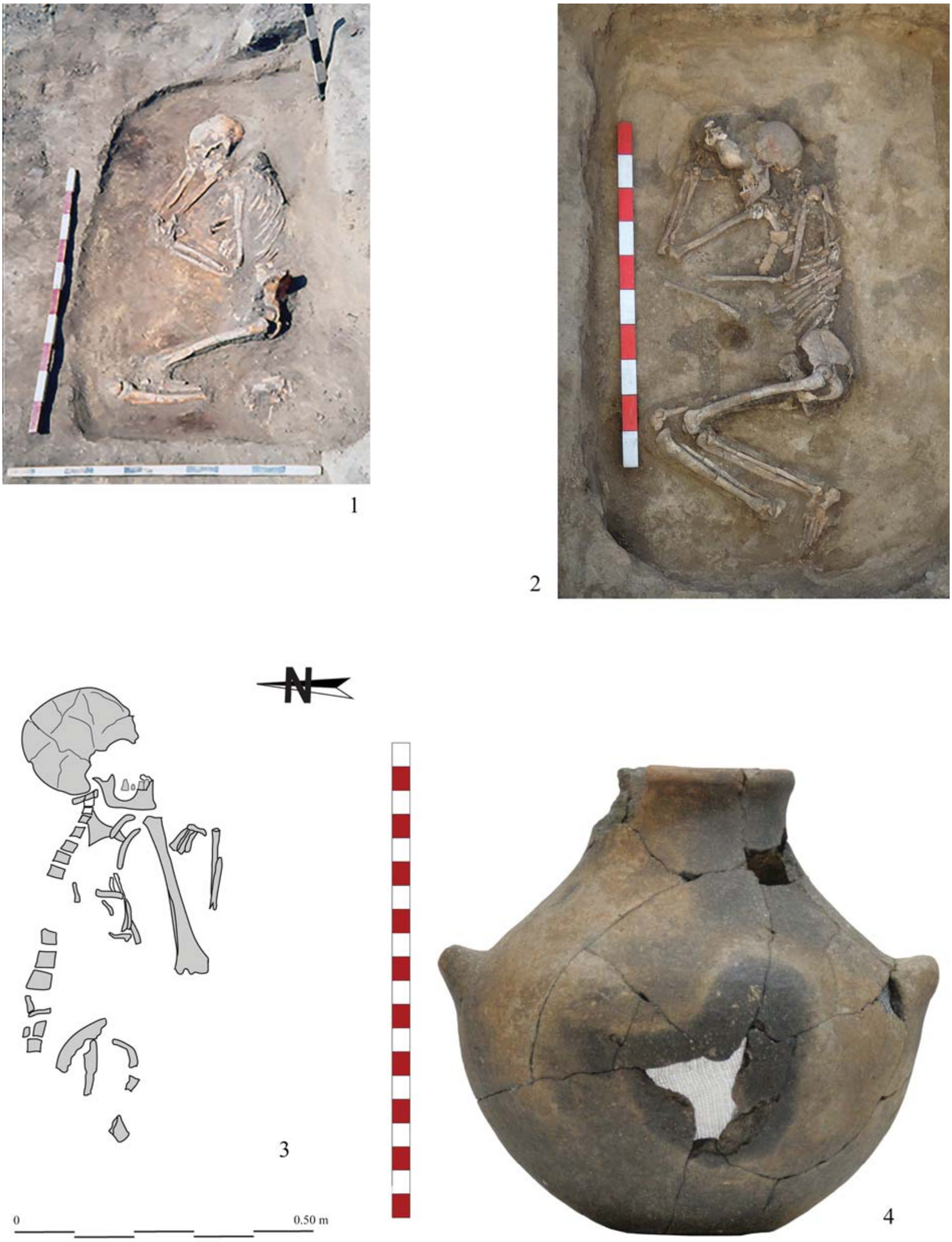

Fig. 3. Relaxed hocker graves from Northeast Bulgaria. 1. Pliska-West necropolis, barrow 27, grave 1, 2. Vetrino 2 necropolis, barrow 7, grave 1, 3–4. Pet mogili necropolis, barrow 3, grave 4

Stratigraphic observations

The discussed graves were the only ones in Pliska-West and Ralitsa cases. However, it should be noticed that the two barrows were not completely excavated. In Pet mogili, the grave under discussion was the only EBA grave, but the barrow was reused in later periods that might have affected other BA graves. In three barrows, stratigraphically next come inhumations in supine position with flexed legs. In Chudomir, these were two graves dated to the 3100–2900 cal BC period. The barrow was enlarged and encircled with a stone cromlech. The last in the EBA sequence were six inhumations in semi-supine positions (dug into the barrow fill, but without additional piling of barrow fills) dated to the 2900–2650 cal BC period (Alexandrov 2020b). Although without a clear stratigraphic order established, the barrows from Kiulevcha, Madara, barrow 2, and Kamentsi presented a similar sequence, i.e. relaxed hockers as primary graves – supine inhumations with flexed legs as secondary graves. In Kamentsi, Vetrino, and Belogradets, secondary were graves in hocker/semi-supine position with one arm alongside the body. In Kalugeritsa and Madara barrow III, stratigraphically the relaxed hocker graves were followed by extended inhumations with no certain date.

Chronological position of the group

Currently, we have at our disposal six radiocarbon dates related to the grave lot, all of them coming from human skeletal remains (*Figs. 4* and *10*). Two dates are earlier – Pliska-West and Chudomir that, with great probability enter the 3339–3012 cal BC and 3333–3011 cal BC period respectively.[2] Three of the AMS dated graves (Kamentsi, Belogradets, and Vetrino) enter 3105–2912 cal BC, 3093–2912 cal BC, and 3029–2912 cal BC period respectively. The latest grave from the lot seems to be the Ralitsa one, entering the 3013–2901 cal BC timespan. Generally, the chronological position of the discussed graves in 3300–2900 cal BC seems quite tenable. The grave goods, although not very sensitive chronologically, do not contradict the time-period proposed; for the Pet mogili amphora even an earlier date is being discussed (Alexandrov – Kaiser 2016, 365).

The graves discussed present some common features that could be outlined as follows:

- All graves from this group were ***primary*** for their respective barrows;
- The barrows themselves were ***relatively small*** - around 20 m in diameter, rarely exceeding 1 m in height;
- The grave facilities (with one exception – Kiulevcha, barrow 1) were ***rectangular pits***; it seems that most of them had ***steps***; more than half of the pits were covered with wooden planks/tree barks; the pit floor covering is mentioned for Pliska-West, Plachi dol, and Kalugeritsa graves;
- The ***use of stones*** in mortuary practices is to be mentioned as well (in 3 of 11 features) such as rings of stones around the graves (Kalugeritsa and Kiulevcha) or, encircling the grave-pit with stones (Vetrino);
- Ten of eleven features were ***single*** graves;
- Buried were persons of ***both sexes*** – 5 females, 3 males, and 1 infant; in Belogradets, male individual with 2 infants were buried;
- Buried were persons of ***all ages*** – from *infans I* to *maturus* age groups, with predominance of the adult persons buried;

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[2] The dates were calibrated with OxCal 4.4.4 program using the IntCal20 curve. All dates are presented in the 95.4% probability range.

- The bodies were placed in ***relaxed hocker position*** (on their right – 81.8% or left side – 18.2%), the angle formed between the spinal column and the femurs being around or bigger than 90°; the arms were bent at the elbows, with both palms in front of the skull or one of them in front of the torso;
- The orientation of the body is in ***west–east axis***, with the head predominantly in the western sector;
- Six skeletons had ***red ochre*** over the bones, especially in the skull area; in two graves lumps of ochre were found near the skeletons;
- Three graves contained ***grave inventory*** – clay vessel (Pet mogili); golden hair-ring and flint core (Chudomir) and silver ring (Kalugeritsa). Animal bones were found in Belogradets grave.
- The chronological position of the group is, generally, between 3300–2900 cal BC.

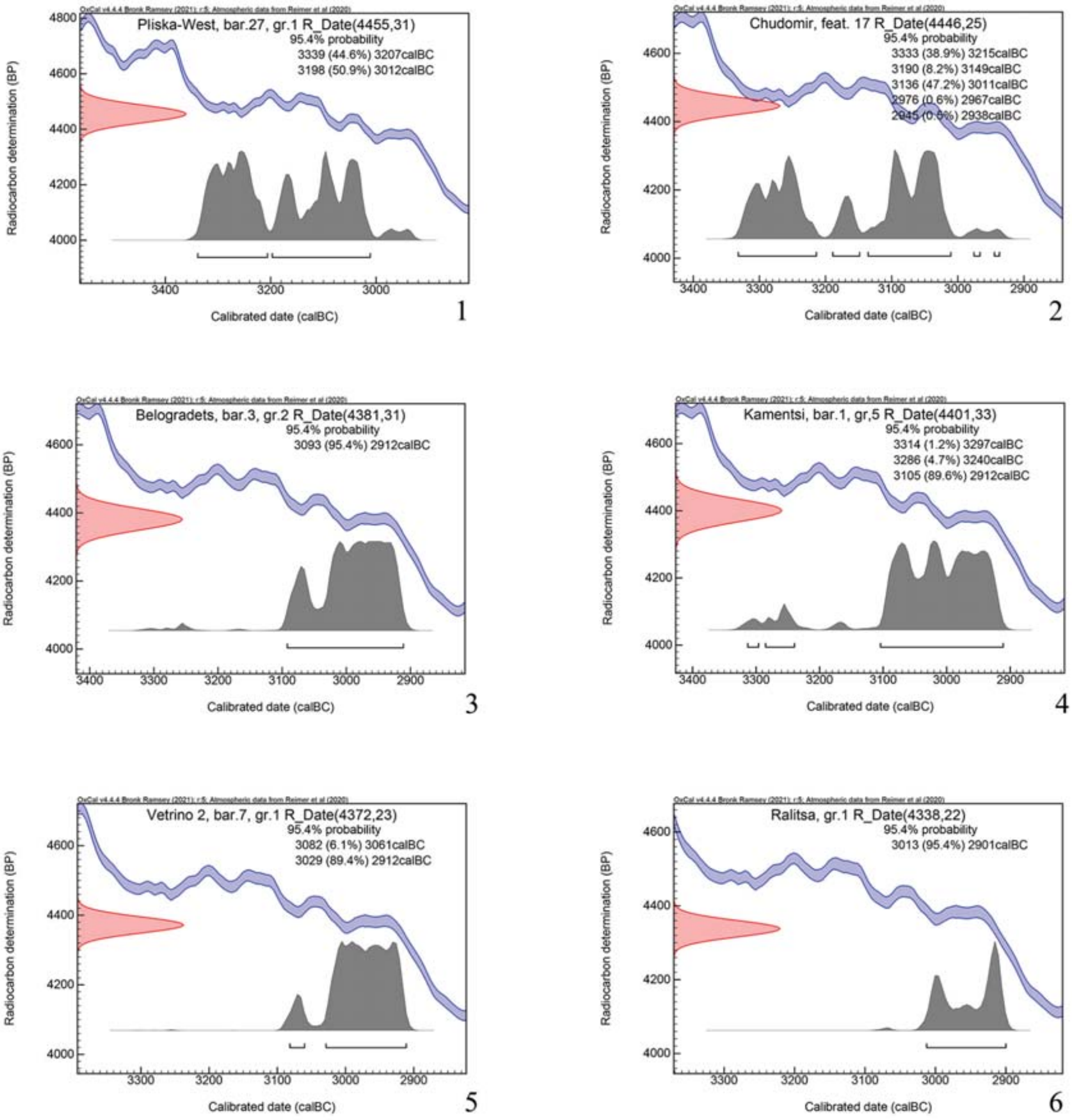

Fig. 4. Relaxed hocker graves from North Bulgaria. Radiocarbon dates. 1. Pliska-West necropolis, barrow 27, grave 1, 2. Chudomir, barrow 1, feature 17, 3. Belogradets necropolis, barrow 3, grave 2, 4. Kamentsi necropolis, barrow 1, grave 5, 5. Vetrino 2 necropolis, barrow 7, grave 1, 6. Ralitsa, barrow 1, feature

The relaxed hocker graves in North Dobroudja (*Figs. 1* and *5*)

Relaxed hocker barrow graves, very similar to the North-East Bulgarian ones, are known from North Dobroudja as well – Anadolkioi, barrow 2 (Schuchardt – Traeger 1918, 152–153); Rahman, barrow 2 (Ailincăi *et al.* 2016, 35–36, fig. 7) and Tulcea – sud, barrow 1 (Simion 2003, 17, fig. 3). All three graves were primary for their respective barrows. Unfortunately, no radiocarbon dating for these features is available. Considering the lack of grave inventory as well, for now a *terminus ante quem* for their chronological position could only be established, i.e. the dating of the secondary grave (no. 5) from Rahman – 2570–2340 cal BC (Ailincăi *et al.* 2016, 35–36). In fact, similar graves could have been found in Zebil, barrow 3 (Simion 2003, 21–22) and Enisala, barrow 5 (Vasiliu 2004, 125–126), for example, but due to some discrepancies in the original publications, they will not be discussed here. What is relevant is that such graves existed in North Dobroudja as well and, most probably, they are to be dated in the same period as the above-presented ones.

The relaxed hocker graves in Muntenia (*Fig. 5*)

EBA barrow graves in relaxed hocker position were also found in Muntenia. Similar graves have been investigated in Păuleşti II and Păuleşti III barrows, for example (Frînculeasa – Preda – Heyd 2015, Pl. 10; 11). In those regions and, especially in the Ploieşti area, they appear as primary graves in "… small tumuli, no more than one meter high", in "…individual, double or collective graves, with post-

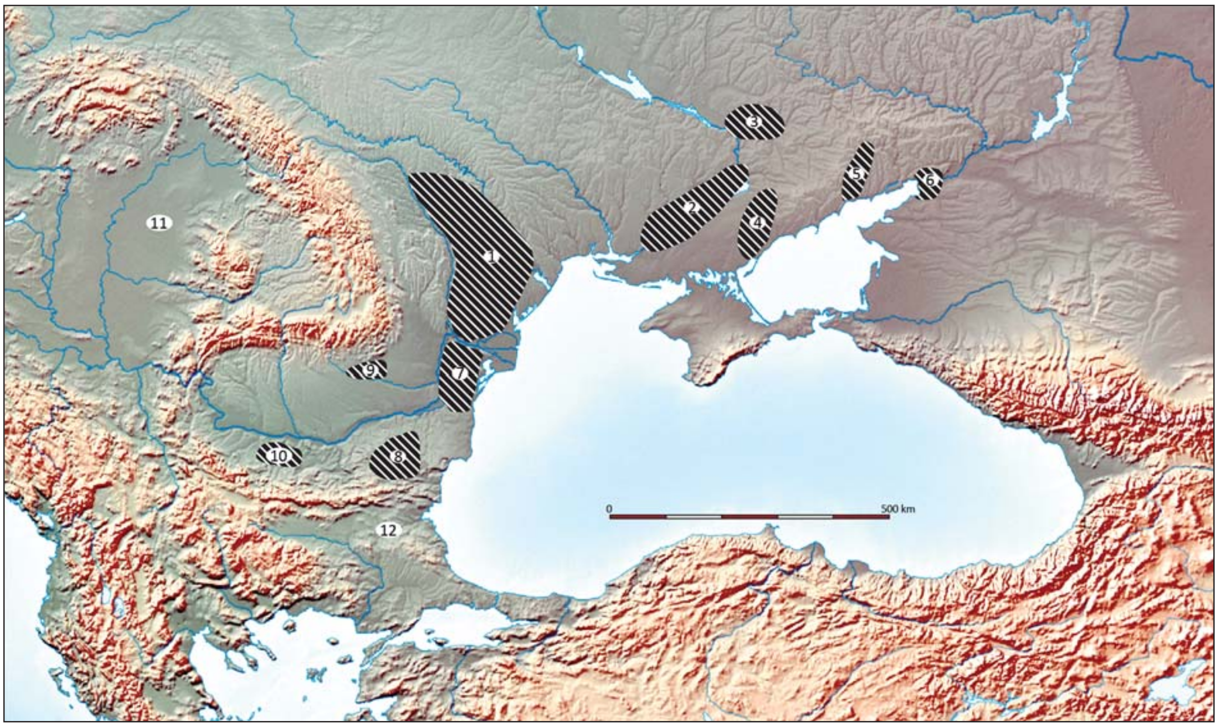

Fig. 5. 1–6. Zhivotilovka-Volchanskoe graves (after Rassamakin *2021) 1. Prut-Dniester group, 2. Dnieper-Ingulets group, 3. Samara group, 4. Molochnaya group, 5. Kal'mius group, 6. Lower Don group, 7. North Dobroudja relaxed hocker graves, 8. North-East Bulgaria relaxed hocker graves, 9. Prahova relaxed hocker graves group, 10. Central- and North-West Bulgaria relaxed hocker graves, 11. Sárrétudvari-Őrhalom barrow; 12. Boyanovo barrow*

mortem manipulation of bones" (Frînculeasa 2021, 187–188). The use of red ochre and stones in mortuary practices and the richness of the grave goods (related to Baden/Coţofeni cultural block) are to be mentioned as well. Those graves are considered to be of local origin and defined as pre-Yamna, dating to the 3300–2900 cal BC period (Frînculeasa – Preda – Heyd 2015, 35–38; Preda-Bălănică – Frînculeasa – Heyd 2020, 91; Frînculeasa 2021).

The relaxed hocker graves in the western part of the Lower Danube (*Figs. 1* and *5*)

Such graves are known in the western part of the Lower Danube region as well. From Central-North and North-West Bulgaria four graves match the above-mentioned characteristics as follows: Goran-Slatina – Barrow VII, grave 5 (*Fig. 6.4–5*); Tarnak – *Ninovska barrow*, grave no. 2 (*Fig. 7.4*); Tarnava – *Glavchovska barrow*, graves nos. 1 and 4 (*Fig. 8*).[3] The use of red ochre is mentioned for all the graves; grave inventory – clay vessels were found in the two Tarnava graves. The stratigraphic data for the four graves show a similar picture as in the other regions discussed: these are primary graves, stratigraphically followed by inhumations in supine position with flexed legs. In the absence of ^{14}C dates, the chronological position of the Tarnava graves can only be established using their grave inventory. The pottery from the two graves (*Fig. 8.1–4*) is related to Coţofeni Culture, phases II–III (Alexandrov 2019). Three recently obtained and still unpublished ^{14}C -AMS dates related to these phases in North-West Bulgaria come from Gradets settlement, level I (Vidin region) related to Coţofeni III phase – SUERC-87793: 4322±30 BP and Rasovo, site 2002 (Montana region) – SUERC-92422: 4300±28 BP and SUERC-92423: 4395±28. The dates are coming from two pits related to the Coţofeni Culture, phases II–III (*Fig. 9*).[4] These dates fully correspond to the ones obtained for Coţofeni III in Transylvania (Diaconescu 2020, 32; Ciugudean – Quinn – Uhnér 2022). According to these data, the chronological position of Tarnava hockers should generally be positioned in the 3100–2900 BC timespan. The date of the other two graves – Tarnak and Goran-Slatina is currently uncertain. North of the Danube river, in Oltenia, such graves are currently unknown but this could be a result of the relatively limited number of EBA barrows investigated there (Preda-Bălănică – Frînculeasa – Heyd 2020, 86, Table 1) or, of the lack of available information.

Such graves are known even further west, east of Tisza River – in Sárrétudvari-Őrhalom barrow, grave no. 12 – primary and grave no. 10 – secondary. The calibrated radiocarbon dates (*Fig. 10*) from the graves enter 3365–3095 cal BC and, 3092–2893 cal BC periods respectively (Dani – Nepper 2006, 35–39, 44, 48; fig. 7/2, 8/2).

The relaxed hocker graves in Upper Thrace (*Figs. 1* and *5*)

So far, south of the Balkan range only two such barrow graves, out of more than 200 investigated (Alexandrov 2020a) are known. They both come from the Yambol region, Boyanovo-*Baylar kayryak*, barrow 1. The first grave, labeled as no. 19 in the barrow graves sequence, was an inhumation of an adult individual (no sex determination) in relaxed hocker position to the right, head in the eastern sector. Both arms were bent at the elbows, the right palm – in front of the skull, the left one – in front of the torso.

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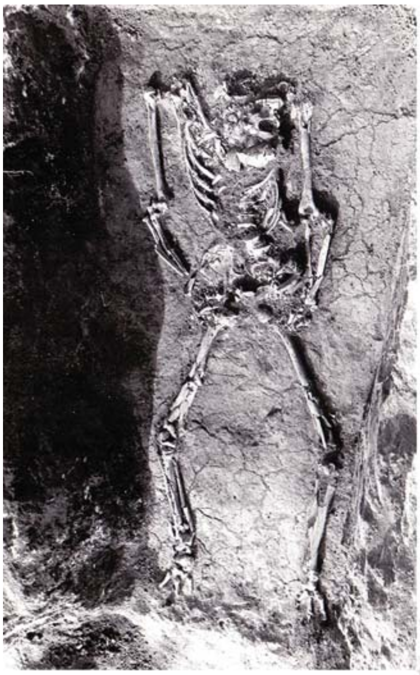
[3] All the data and references regarding the respective graves are presented in the Catalogue at the end of the text.

[4] The Gradets site was excavated in the 1980's by Ana Iotsova and still remains unpublished. The author would like to express his gratitude to Dr. Kalin Madzarov (National Archaeological Institute with Museum - Sofia) for kindly giving permission to use the results of his excavations at Rasovo.



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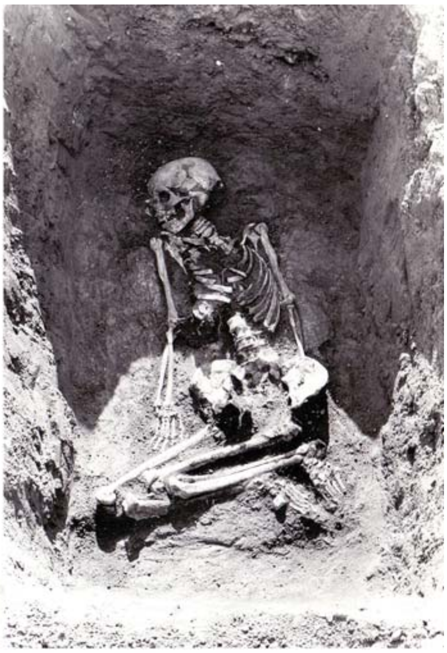

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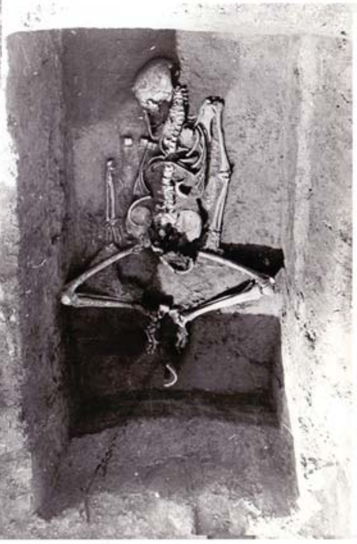

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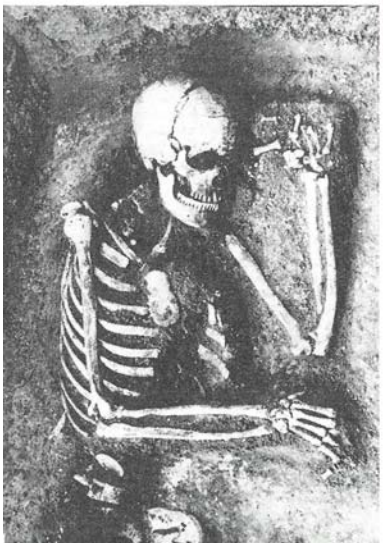

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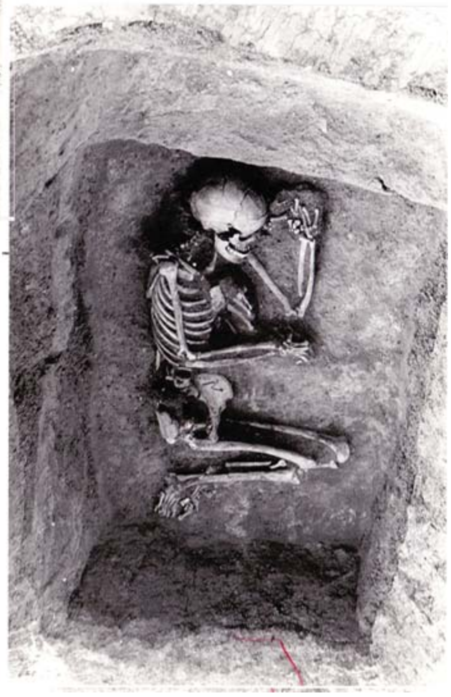

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Fig. 6. Goran-Slatina necropolis, barrow VII. 1. Grave 3, 2. Grave 4, 3. Grave 1, 4–5. Grave 5 (after Kitov – Panayotov – Pavlov 1989)

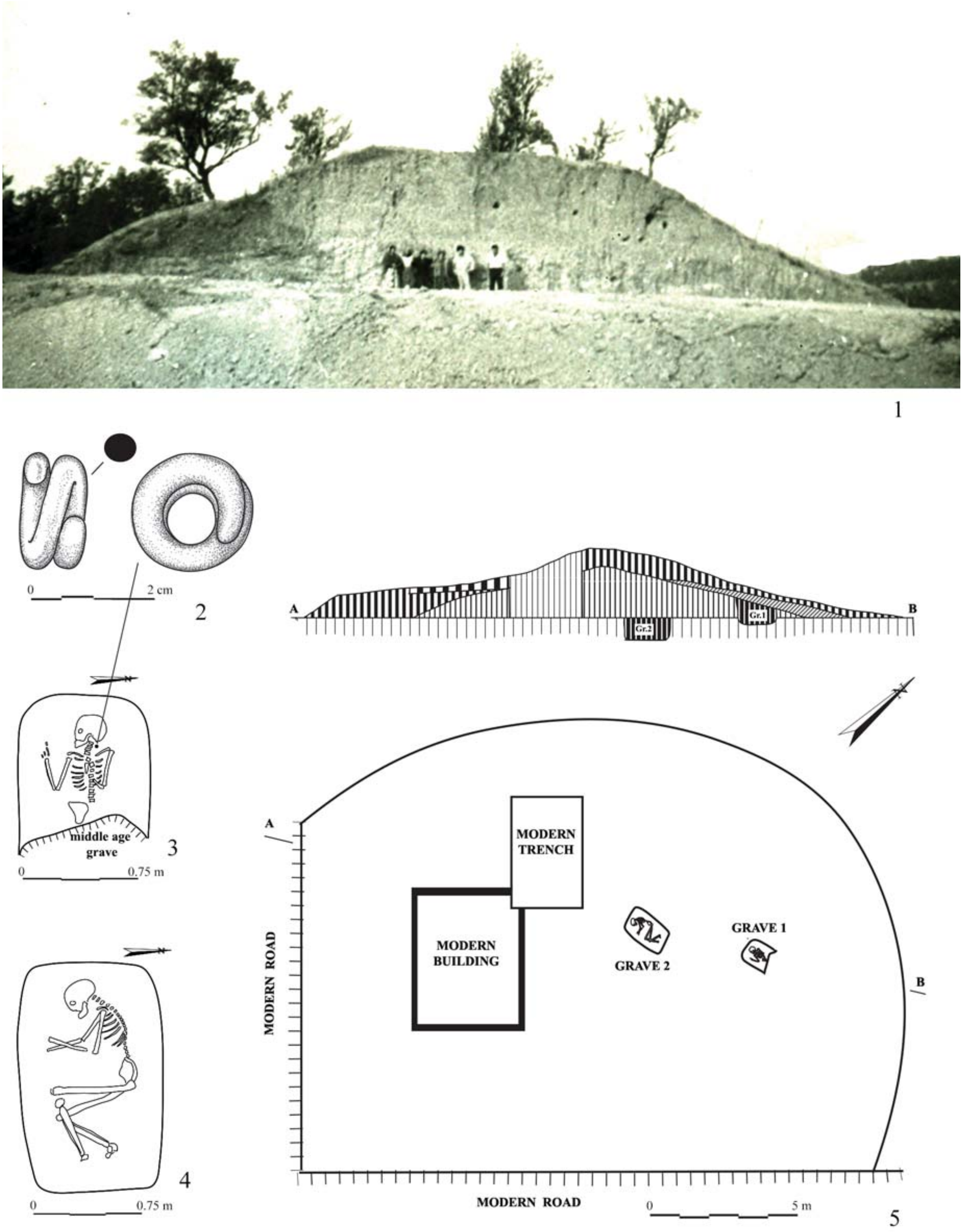

Fig. 7. Tarnak barrow. 1. Photo from the excavations, 2–3. Grave 1, 4. Grave 2, 5. Horizontal plan and section of the EBA graves (after ALEXANDROV *2019)*

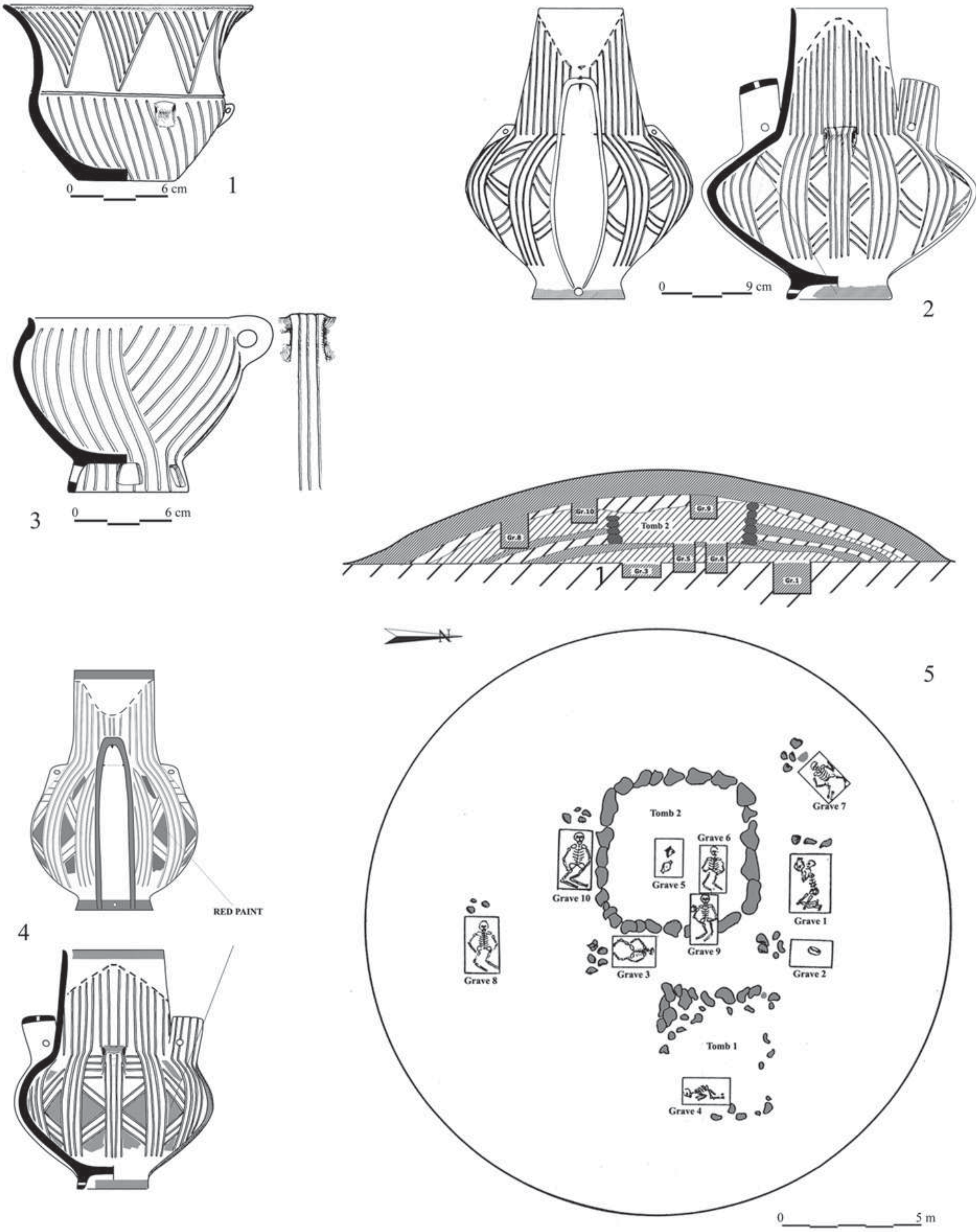

Fig. 8. Tarnava necropolis, "Glavchovska barrow". 1. Vessel from grave 4, 2. Vessel from grave 1, 3–4. Vessels from grave 5, 5. Horizontal plan and section of the EBA graves (after ALEXANDROV *2019)*

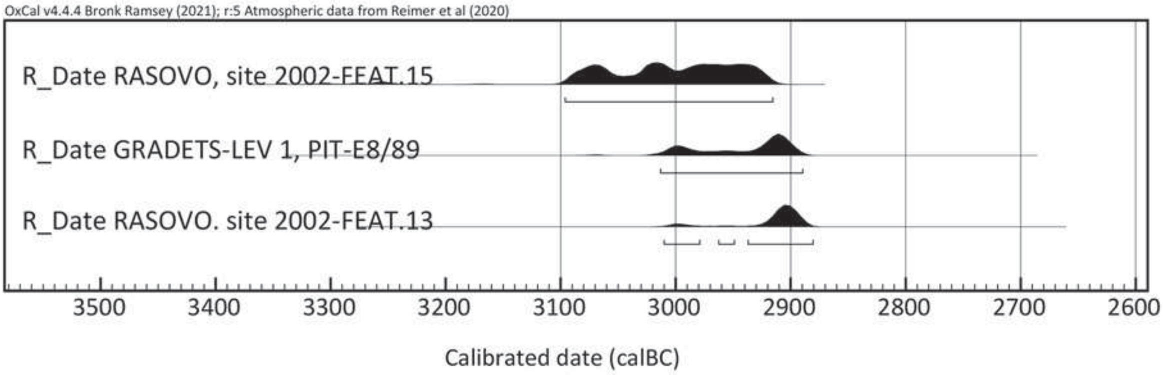

Fig. 9. Calibrated radiocarbon dates from Coţofeni II–III sites in North-West Bulgaria

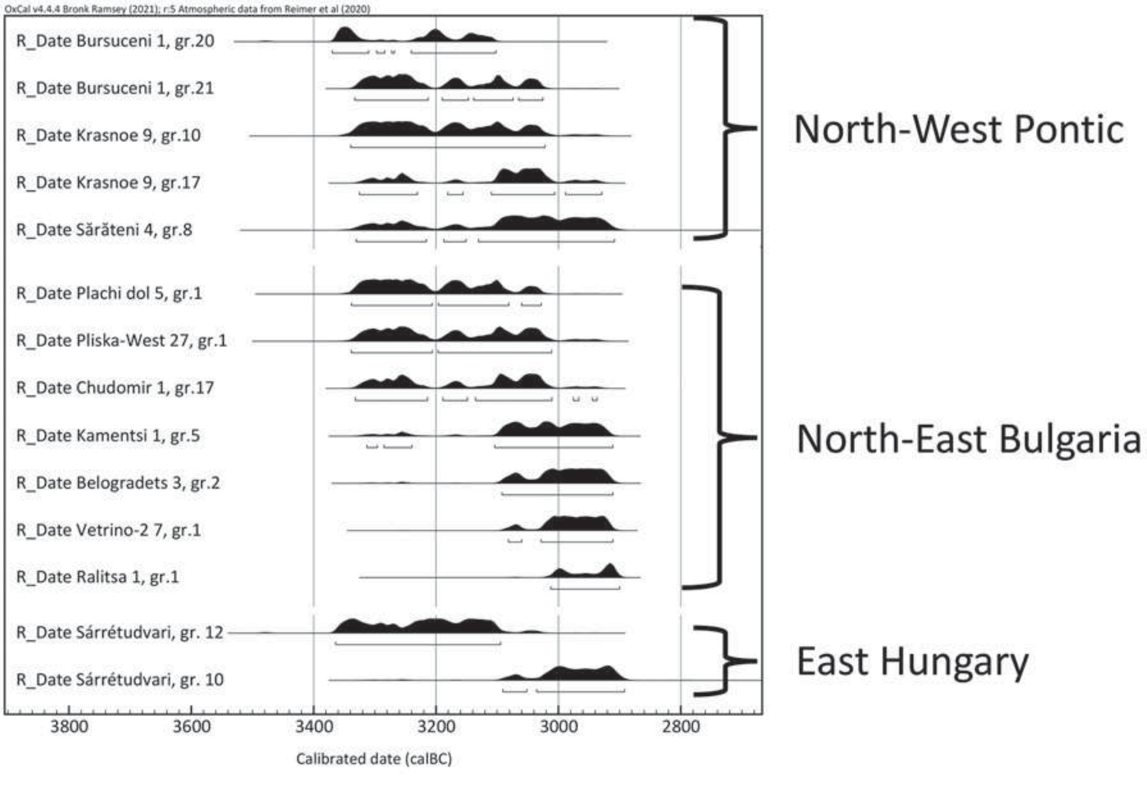

Fig. 10. Relaxed hocker graves from North Pontic region, Lower Danube region and Hungary. Calibrated radiocarbon dates

Red ochre was spread over the skull, upper and lower limbs (*Fig. 11.2*). In the same grave-pit, some 0.30 m below the skeleton described above, another grave was found, labeled as no. 20. It contained the skeleton of an adult female (25–30 years old) arranged in the same position (head to the west), both arms bent at the elbows and placed in front of the torso. In the feet area, scattered bones of a child (4–5 years old) were placed (*Fig. 11.1, 3*). Red ochre was spread over the bones as well. No inventory was found in both graves. The original barrow fill covered those two graves. It was made of stones, with oval form with 6.20 by 8.10 m diameters and 1.30 m height. Stratigraphically, next in order come seven graves

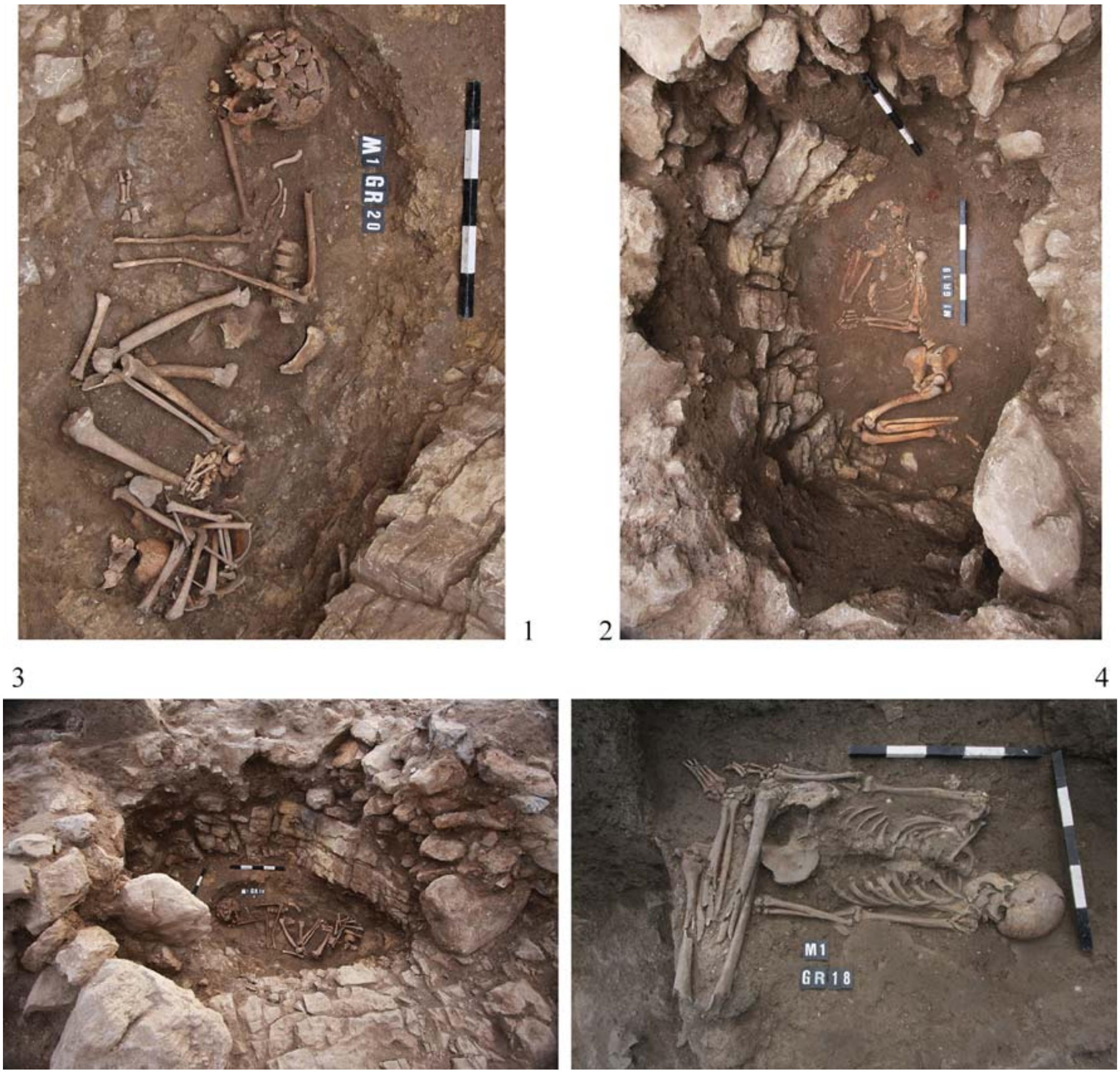

Fig. 11. Boyanovo, "Baylar kayryak", barrow 1. Graves nos. 18, 19, and 20 (after Iliev – Bakărdžiev *2020;* Privat *et al. 2018)*

with supine inhumations with flexed legs and additional piling of barrow fills (Iliev – Bakărdžiev 2020, 24–27; taf. 41–57; Privat *et al*. 2018, 182–184). Considering the stratigraphic sequence, the chronological position of both relaxed hocker graves should be considered earlier than the one of the supine graves. The earliest date from that group was provided by grave no. 18 (*Fig. 11.4*). The calibrated AMS date from there enters the 3099–2938 cal BC period (Alexandrov – Włodarczak 2022, 234) that should be considered as a *terminus ante quem* for the relaxed hocker graves from the barrow.

Two more flat graves come from Yunatsite tell (western part of Upper Thrace). They were related to the first BA building level there – XVI/XVII–1. In both graves, adult individuals were buried (male – in grave no. 55 and female – in grave no. 52). The position of the deceased was hocker to the right, arms bent at the elbows with palms in front of the abdomen. Both grave-pit floors were covered with organic mats. The female grave revealed two silver rings, a bronze (?) awl and a jug as grave inventory (Mishina – Balabina 2007, 169–173). The absolute dating of the graves could be established by a radiocarbon date from level XVI/XVII (IGAN-2794: 4380±70 BP) that, calibrated, enters 3333–2889 cal BC period (Bojadzhiev 2007, 220).

The relaxed hocker graves in North-Pontic area (*Figs. 5* and *10*)

Since the 1970s and, especially in the last 20 years, the appearance and nature of the relaxed hocker barrow graves in the North-Pontic area have been largely discussed. They were described as inhumation barrow graves in "…crouched position on one side with the arms bent and the hands in front of the face" (Rassamakin 2021, 195). The group is known under different denominations, such as "Zhivotilovka-Bursuceni", "Zhivotilovka-Volchanskoe" or "Zhivotilovka-Volchanskoe-Bursuceni" (Burtănescu 2002, 390–391; Rassamakin 2004, 55–59, 208–209; 2021; Demchenko 2016; Manzura 2016). In its frame, six local groups have been distinguished, nos. 2 to 6 located north of Azov Sea; group 1 (called "Prut-Dniester group") being geographically the nearest to the graves discussed here, reaching the Danube-river delta (Rassamakin 2021, 152, fig. 1). Recently, more than "…90 kurgans with about 150 burials" have been assigned to that group. With the exception of four barrows, "…almost total absence of stone structures in the form of cromlechs, cairns, a dome-shaped coating of the mound" is mentioned (Manzura 2016, 153, fig. 1). Another specific element of the mortuary practices is the richness of the grave inventory – necklaces, pendants, tools, etc. Vessels were discovered in more than 50% of the graves, including painted Tripolye C2 pottery (Manzura 2016, figs. 5–7; Rassamakin 2021, figs. 3–5, 7).

Stratigraphically, "Zhivotilovka-Volchanskoe-Bursuceni" graves are, as a rule, later than the Late Chalcolithic graves and precede the Yamna ones. At the beginning of the 21st century, these graves were included by Y. Rassamakin in his group IIIC of the Eneolithic graves in the North-Pontic region, dated to 3500/3400–3000/2900 BC (Rassamakin 2004, 55–59). Recently, the absolute dating of those graves in the Dniester-Prut area was secured by several radiocarbon dates – from Bursuceni, barrow 1, graves 20 and 21; Sărăteni, barrow 4, grave 8; Krasnoe, barrow 9, graves 10 and 17; Cimişlia, barrow 8, graves 2 and 8. According to them, the chronological position of the group is in the last third of the 4th millennium BC (Manzura 2016; Demchenko 2016) or "…the second half of the 4th millennium BC" (Popovici *et al.* 2015; Popovici – Kaiser 2020, 73–74).

Relations to the other groups

Some of the hocker groups presented here have already been the subject of discussion regarding their cultural affiliation. The graves from Prahova region are considered to be of local origin and related to Baden/Coţofeni populations (Frînculeasa 2020a; Preda-Bălănică – Frînculeasa – Heyd 2020). Grave no.12 from Sárrétudvari-Őrhalom barrow, alongside grave no.3 from Püspökladány-Kincsesdomb are considered to be pre-Yamna graves, "…which in part conform to the mortuary rites of the local Late Copper Age Baden culture and in part to those of the late Eneolithic Lower Mikhailovka culture" (Dani 2020, 48–49). The situation with Zhivotilovka-Volchanskoe-Bursuceni graves is more complicated. Different approaches have been applied when searching the origin and nature of that particular mortuary practice there. As I. Manzura wrote "…the very complex combination of different cultural traits in the burial sites of the Zhivotilovka type is able to generate certain problems in the search for the origins of this phenomenon" (Manzura 2016, 167). Such have been sought in Gordineşti (Demchenko 2016), Usatovo and, especially in Maykop-Novosvobodnaya cultural circles (Manzura 2016; Rassamakin 2021; Popovici 2015).

Generally, the cultural development in ***North-East Bulgaria*** and ***North Dobroudja*** during the 4th millennium BC is considered to be related to Cernavodă phenomena, the first half of the period being associated with Cernavodă I (Manzura 1999), while the second half of the millennium with Cernavodă III presence (Todorova 2011). In fact, currently only four sites with Cernavodă III materials are known from North-East Bulgaria (*Fig. 1*): Koprivets (Nikolova 1999, fig. 8.2/1, 2, 5)[5], Mirovtsi (Zmeykova 2001), Brestak[6], and Durankulak (Draganov 1990). Cernavodă III sites near Kavarna, Kragulevo and Dalgopol were mentioned by Henrieta Todorova but no archaeological materials have been published from there (Todorova 2011, 102). Finally, three more sites are known from North Dobroudja – Cernavodă, Hârşova, and Tuzla (Oanţă-Marghitu 2003, Plate 1). None of these sites provided radiocarbon dates. A Cernavodă III site south of the Balkan range could be of some use – Drama, with absolute dating in the 3600–3100 cal BC period (Gleser 2011, Abb. 7). Additional support for dating the Cernavodă III in the second half of the 4th millennium BC comes from the Usatovo circle dated, generally, in the same period (Diachenko – Harper 2016). Recently, a narrower chronological position for Usatovo, i.e. Cernavodă III group as well, in the third quarter of the 4th millennium BC has been argued (Manzura 2020, 75–76). Usatovo elements in the mortuary practices are clearly visible in some barrows from the northern part of Dobroudja – Luncaviţa-*Drumul vacilor*, barrow I, or the graves with a cairn of stones and rings of stones from Mihai Bravu, Murighiol or Tariverde (Alexandrov 2011). It should be mentioned here that at least two barrow graves with inhumations in supine position with flexed legs – Belogradets, Barrow 1, grave 2 and Riltsi, Barrow 264, grave 4 provided ^{14}C-AMS dates that, calibrated, could enter a period earlier than 3100 BC.

The 3100–2500 BC period in North-East Bulgaria and North Dobroudja is to be related to what has been called by Petre Roman the "West Pontic Cultural Circle" with its core being the Varna-lakes sites (Roman – Dodd-Opriţescu – János 1992). "Ezerovo" manifestations were recognised in some regions north of the Danube-river as well (Motzoi-Chicideanu 2011, 285–288). Batin (Stanchev 1989) and Smyadovo graves (Chohadzhiev – Mihaylova 2014), in my opinion, could also be related to this phenomenon. During this period, large parts of the area discussed were settled by Yamna populations (Panayotov 1989; Heyd 2011, 536; Alexandrov 2021). In its northern part "…a chronological/spatial correlation between "Cernavodă II" and "Yamna phenomena" is to be seen (Alexandrov – Slavchev – Tonkova 2021, 73). Recently, an even earlier date than 3100 BC for the appearance of Cernavodă II has been argued (Frînculeasa 2020b, 150–158). During the EBA, the "borders" of this arid region are marked by flat single and multiple graves; the "inside" territories – by barrow graves, with inhumations in supine position with flexed legs, semi-supine, hocker and extended position (Alexandrov – Slavchev – Tonkova 2021; Alexandrov 2021a).

Cernavodă III sites are still missing in ***Central North*** and ***North-West Bulgaria***. In the North-West, the 3300–3100 BC period is associated with Coţofeni I Culture, best illustrated by Magura cave materials (*Fig. 12*). East of Coţofeni I area, pottery related to the so-called "Orlea-Sadovec" group – vessels decorated with lines of holes beneath the rim are known (Roman 1976). During the last decades, such materials came from Telish (Merkyte 2007, Pl. 13), Krushovitsa (Ivanov – Zidarov – Dyakov 2014), etc. (*Fig. 13*). Grave No. 9, barrow III from Goran-Slatina necropolis – an inhumation in semi-supine position to the left, with red ochre over the bones as well as "…relatively big quantity of ochre in the grave", including "…pieces of considerable size", should be discussed here as well. The grave-pit was

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[5] Some of the materials published as Cernavodă III in fact date to the MBA (Nikolova 1999, fig. 8.2/3) and LBA-EIA periods (Nikolova 1999, fig. 8.2/4).

[6] Rescue excavations in 2021 directed by Hristo Kuzov from Varna Archaeological Museum.

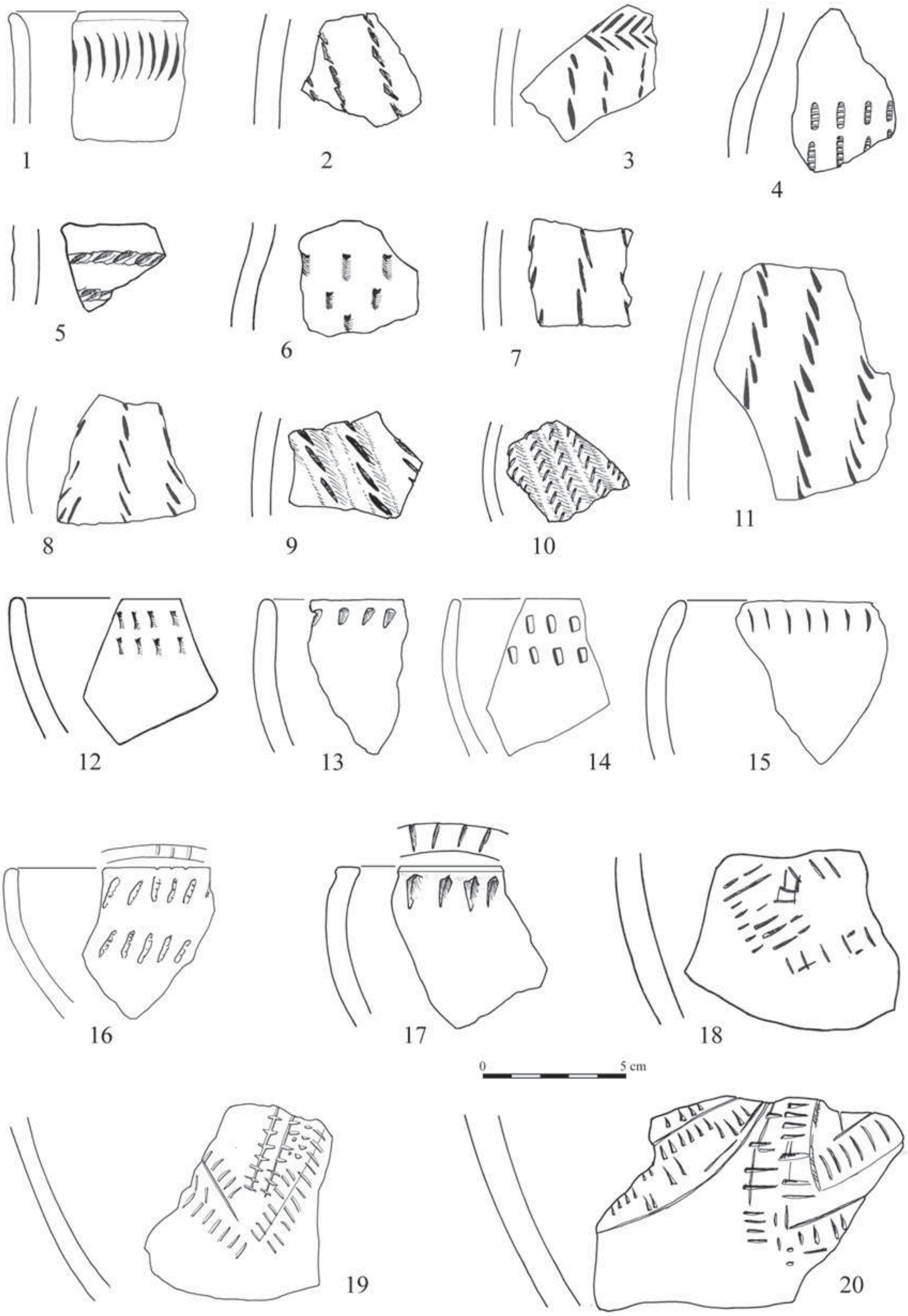

Fig. 12. Magura cave. Coţofeni I pottery (drawings S. Alexandrov)

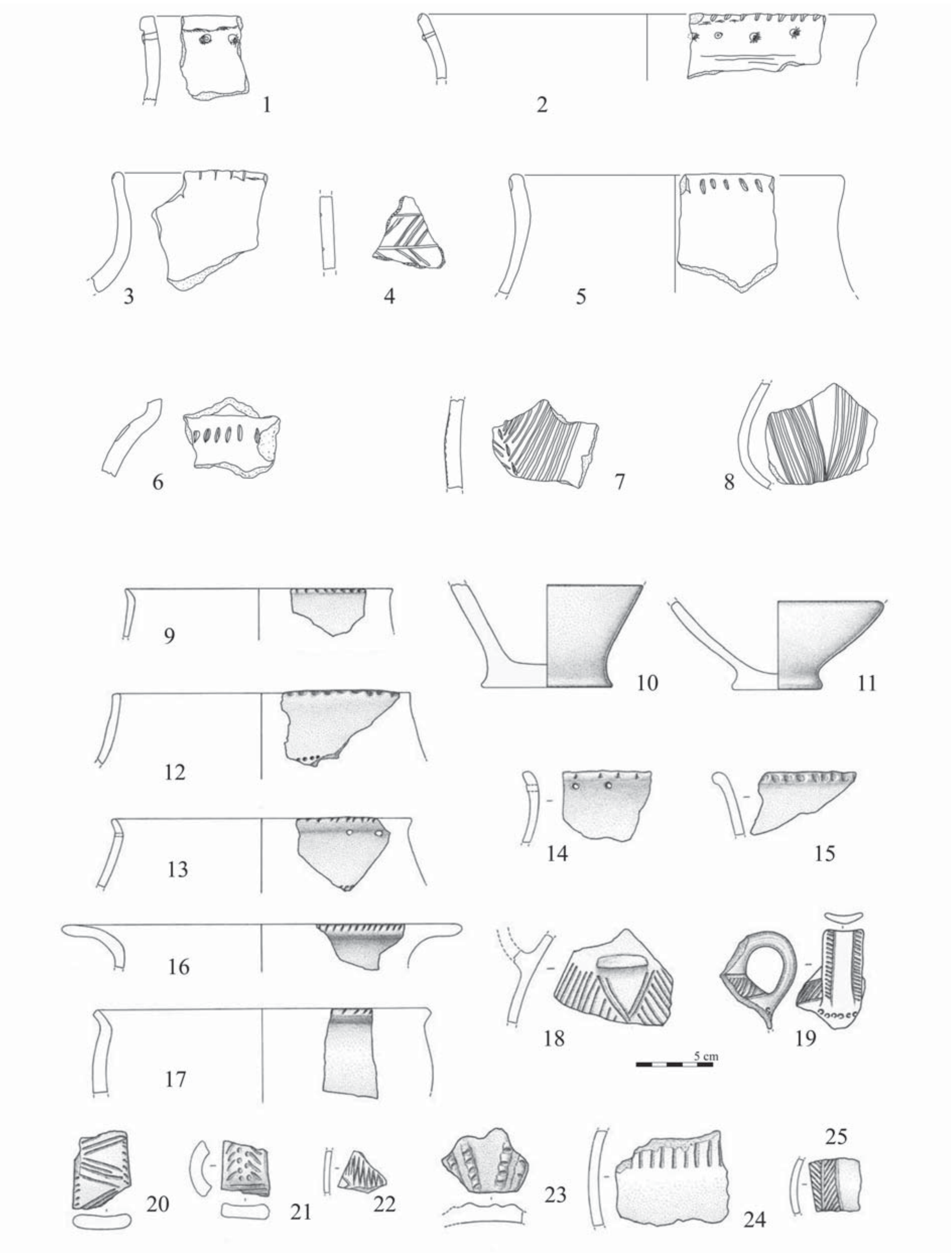

Fig. 13. Orlea-Sadovec pottery. 1–8. Krushovitsa (after Ivanov – Zidarov – Dyakov *2014), 9–25. Telish (after* Merkyte *2007)*

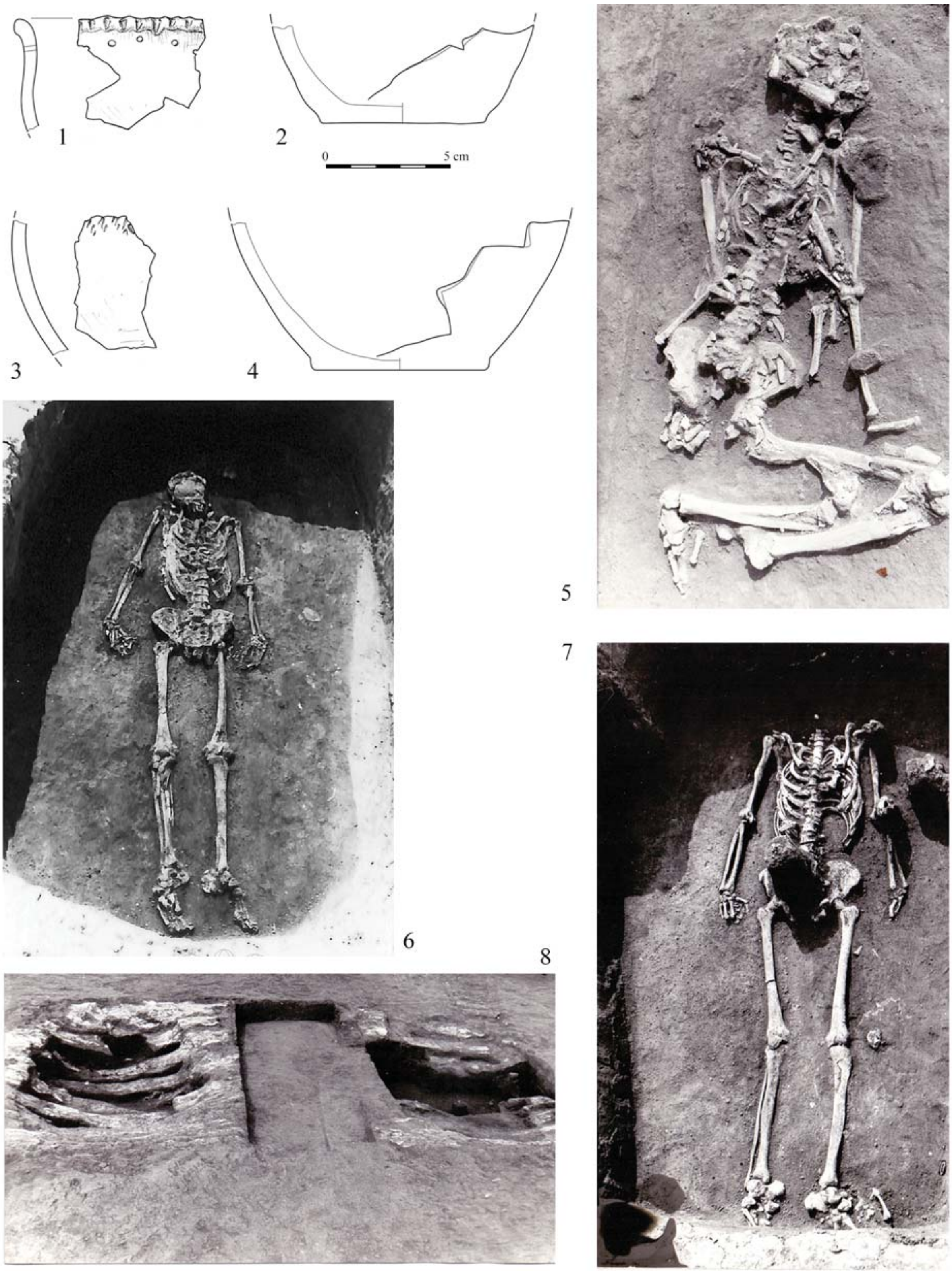

Fig. 14. Goran-Slatina necropolis, barrow III. 1–4. Pottery from the cromlech (drawings S. Alexandrov), 5. Primary grave no. 9, 6–8. secondary extended inhumations – graves nos. 6 and 7 (after Kitov – Panayotov – Pavlov *1989)*

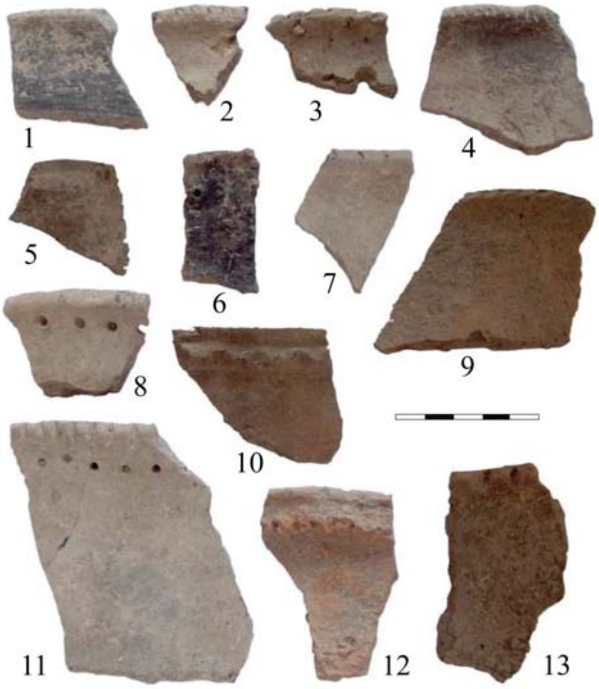

Fig. 15. Dzhulyunitsa - pottery with Orlea-Sadovec characteristics (after Elenski *2012)*

surrounded by a cromlech with a diameter of 8.6 m (Kitov – Panayotov – Pavlov 1991, 30–31, 62–74), between the stones of which pottery sherds as the described ones were found (*Fig. 14.1–4*). Such ceramic sherds appear as far east as Dzhulyunitsa site, Veliko Tarnovo region (*Fig. 15*). The 3100–2900/2800 BC period in North-West Bulgaria is characterised by Coţofeni II–III manifestations (Alexandrov 1995), while the cultural affiliation during that period in Central North Bulgaria still remains unclear.

Mortuary practices in the region are presented by 59 barrow graves[7] from Polsko Kosovo (Stanchev 2002), Kozlovets (Alexandrov – Kirov – Atanassova 2019), Vladinya,[8] Goran-Slatina (Kitov – Panayotov – Pavlov 1991), Tarnava, Kneza, Tarnak (Alexandrov 2019) and flat graves *(Fig. 1)*. The latter are presented by cremation graves in the Coţofeni area – Tarnyane necropolis, Vidin region, North-West Bulgaria (Vasileva – Nikolaeva – Vasileva 2022) and inhumation graves in Central-North Bulgaria. Such graves come from Telish-Lâga (Merkyte 2005), Ezero–Kaleto (Merkyte 2007), Vladinya (Valentinova – Gushterakliev – Ivanov 2020), Svishtov/Novae (Dimitrov *et al.* 1967, 82, 100; Fig. 9; 32/б), and Dzhulyunitsa (Elenski 2010, 33–34, Fig. 1; Mathieson *et al.* 2018, Supplementary Note 1). The chronological position of the flat graves covers the 3400–2800 cal BC period (*Fig. 16*). The EBA flat graves in the Lower Danube are *a priori* related to local populations. Considering the above mentioned about their cultural affiliation, their relation to the barrow graves and, especially to the relaxed hocker graves is a problem of a separate analysis.

Most of the barrow graves in Central-North and North-West Bulgaria have been related to "Yamna" populations (Panayotov 1989; Kaiser – Winger 2015). Unfortunately, only three radiocarbon dates from those graves are available (5% of their total number): SUERC-84750: 4380±26 BP for Kozlovets grave (supine position with flexed legs), SUERC-84761: 4169±26 BP for Goran-Slatina, barrow 2,

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[7] The four relaxed hocker graves discussed earlier are included in this number.

[8] Rescue excavations in 2022 directed by Diana Dimitrova (National Archaeological Institute with Museum – Sofia).

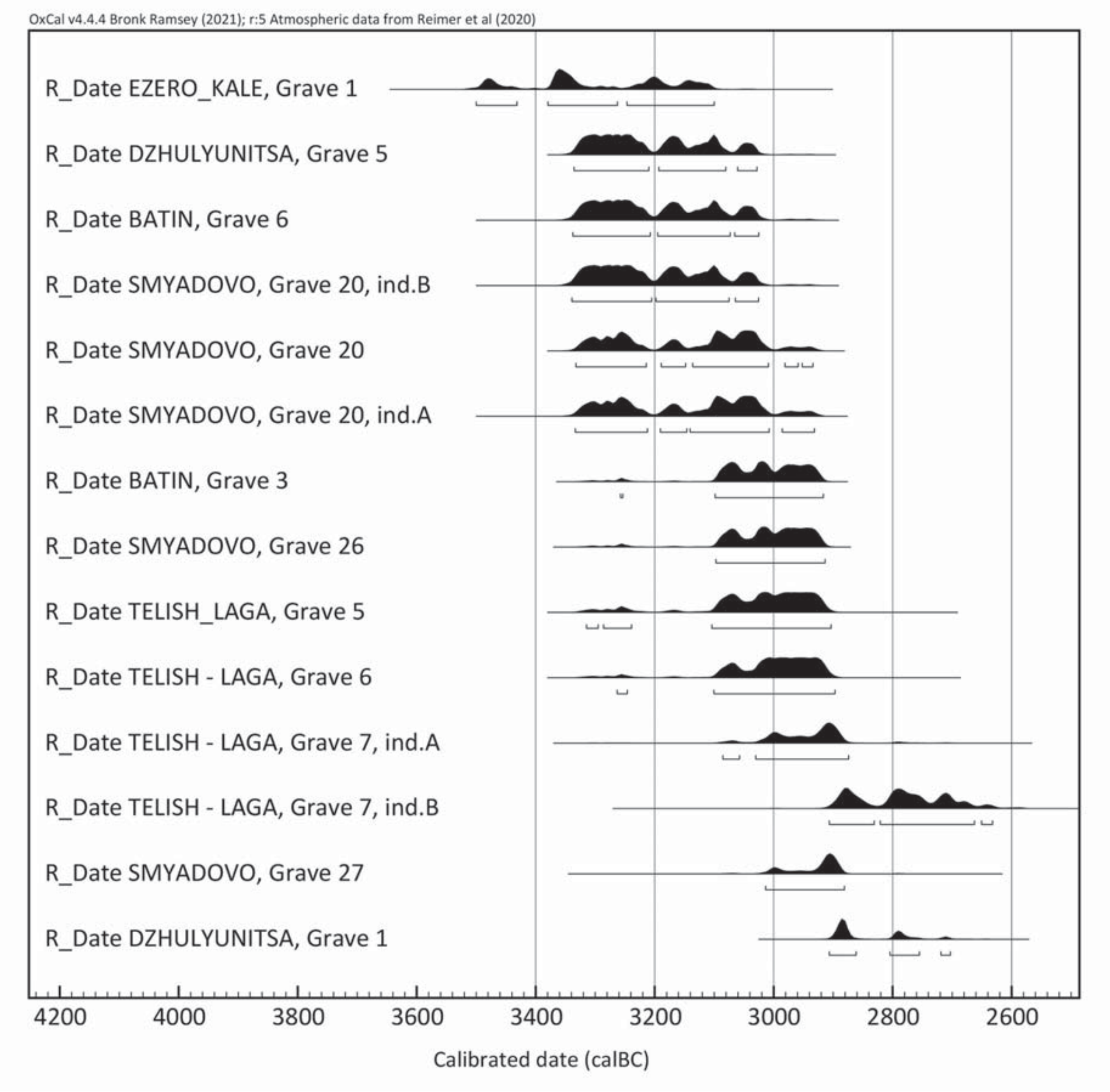

Fig. 16. Early Bronze Age flat graves from North Bulgaria. Calibrated radiocarbon dates

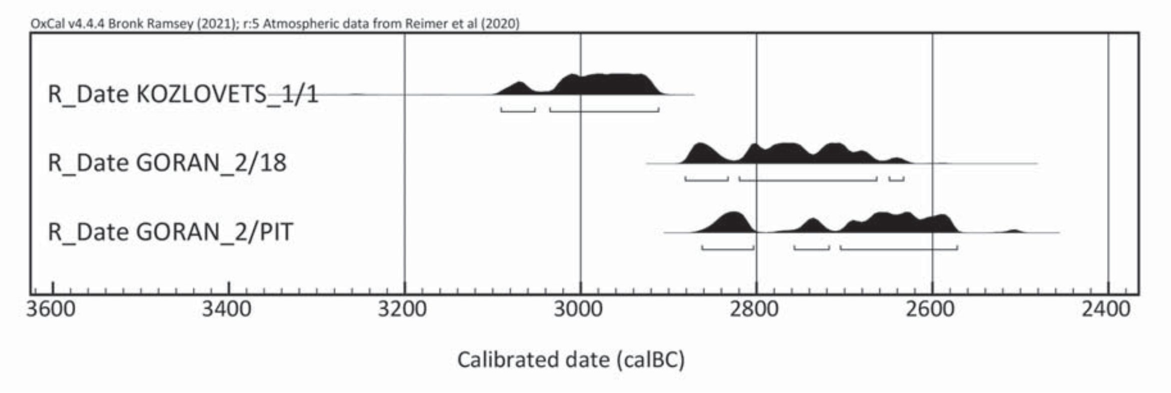

Fig. 17. Calibrated radiocarbon dates from barrow graves in Central-North Bulgaria

grave 18 (semi-supine position) and, SUERC-84762: 4105±26 BP from human bones from "*the Pit*" from the same barrow (*Fig. 17*).

Getting back to the topic of this study, the main question to be asked is what is the place of the relaxed hocker barrow graves discussed here in the frame of the EBA development in Northern Balkans and, even in a broader context? The current data allows some preliminary conclusions to be made, such as:

- During the 3400–3100 BC period these graves are not a North-Black Sea phenomenon only. They cover a much larger expanse, with an east-west axis of more than 1000 km in length (*Fig. 5*). Currently, the concept of "chronological horizon" (Manzura 2016, 169) for that phenomenon seems acceptable;
- In the Prahova region, in the 3400–3100 BC period, these graves were related to the local populations. In my opinion, for the North-East Bulgaria and North Dobroudja regions, even if there are no undeniable pieces of evidence, a relation to Cernavodă III – Usatovo phenomena could be argued;
- The post-3100 BC relaxed hocker barrow graves in the region discussed are, probably, to be related to local populations. Their nature and affiliation with the "Yamna" graves are yet to be established.

Catalogue of the relaxed hocker graves in North Bulgaria

1. ***Kamentsi necropolis, barrow 1, grave 5***, Silistra region (Vagalinski 2020). Primary grave. Female, 16–25 years old. Elongated rectangular pit, covered with "…plant sheet/fabric". Relaxed hocker to the right; right arm in front of the head, left one – in front of the chest. Orientation southwest - northeast, head to the southwest, facing south. No red ochre, no grave inventory. According to the stratigraphic observations, the barrow fill piled above the grave would have been about 25 m in diameter and 1.70 m in height. ^{14}C date: SUERC-63823: 4401±33 BP (*Fig. 2.1; 4.4*).
2. ***Pet mogili necropolis, barrow 3, grave 4***, Shumen region (Alexandrov – Kaiser 2016, 365; Alexandrov 2021a, fig. 12/5, 6). Primary grave. It was partially destroyed by the later use of the barrow fill during the Roman Age. No anthropological data is available; no pit data. Relaxed hocker to the left; east-west direction with head to the east, facing south; arms bent at the elbows with palms in front of the head; lower limbs are missing. Grave inventory – a clay amphora-like vessel (*Fig. 3.3–4*).
3. ***Vetrino 2 necropolis, barrow 7, grave 1,*** Varna region (Alexandrov – Slavchev – Tonkova 2021). Primary grave. Male, 20–30 years old. Rectangular pit with two steps; medium-size stones arranged in one row from east, west and south of the pit; cover on the second pit with tree barks. Relaxed hocker to the right; west-east direction, head to the west, facing south; both arms bent at the elbows, right palm in front of the head, left one – in front of the chest. Red ochre over the ankles, femur, ribs, shoulder, and skull. No grave inventory. ^{14}C date: SUERC-95544: 4372±23 BP (*Figs. 3.2; 4.5*).
4. ***Belogradets necropolis, barrow 3, grave 2,*** Varna region**.** Primary grave. Adult male and two infants *(Infans I)*. The adult individual was placed between the two Infants. No pit data. Relaxed hockers to the right, orientation west-east, heads to the west facing south. Male individual – right arm beneath the head, left arm at the Infant pelvis. No red ochre over the bones. A piece of red ochre was found near the right palm of the male; 16 cm from the male's skull an animal bone was placed. Five post-holes were discovered at the bottom of the pit - 3 at the eastern part, and 2 – at the western one.[9] ^{14}C date: SUERC-87776: 4381±31 BP (*Fig. 2.6; 4.3*).

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[9] In the article published in 2021 we included in the discussed list of graves Belogradets, Barrow 6, grave 1 (Alexandrov – Slavchev – Tonkova 2021, 11). The description of the grave in the excavation's journal kept

5. ***Pliska-West necropolis, barrow 27, grave 1,*** Shumen region (Alexandrov 2021a, fig. 12/1). Primary grave. Male, 20–40 years old. Rectangular pit, the bottom faced with an organic cover. Relaxed hocker to the right; west-east direction, head to the west, facing south; right arm in front of the head, left one – in front of the chest. Red ochre over bones; no grave inventory. ^{14}C date: SUERC-86509: 4455±31 BP (*Fig. 3.1; 4.1*).
6. ***Kalugeritsa necropolis, barrow III, grave 4***, Shumen region (Mikov 1936, 4–5, pl. 1). Primary grave. Buried was a "… young woman". Rectangular pit; the walls and floor faced with wooden planks; the pit itself covered with wooden planks. A ring of three rows of stones with a total height of circa 0.60 m and diameter of 11 m encircled the grave. Relaxed hocker to the right; orientation east-west, head to east facing north. Both arms are in front of the skull. Red ochre over the upper part of the body. Grave inventory - a silver open ring in the chest area (*Fig. 2.2*).
7. ***Madara necropolis*, *barrow 2, grave 2***, Shumen region (Mikov 1934, 431). Primary grave? Female. No pit data. Relaxed hocker to the left; orientation west-east, head to west facing north. Both arms are in front of the skull. Red ochre over the bones; pieces of ochre near the skull and arms. No grave inventory.
8. ***Madara necropolis, barrow 4, grave 4***, Shumen region (Mikov 1934, 436). Primary grave? Adult male. No pit data. Relaxed hocker to the right; orientation northeast–southwest, head to northeast facing north. Both arms are in front of the skull. No red ochre. No grave inventory.
9. ***Kiulevcha necropolis, barrow I, grave 3,*** Shumen region (Mikov 1936, 8, pl. 4; Alexandrov 2011, 311). Primary grave. Infant, 6–7 years old. The oval pit is encircled by a single row of stones with a diameter of 3 m. Relaxed hocker to the right; southwest–northeast direction, head to the west, facing north. Both arms are in front of the skull. Red ochre over the skull and torso; no grave inventory.
10. ***Ralitsa, barrow 1, feature 1,*** Targovishte region (Karailiev – Petrova 2021). Primary grave. Female, 25–30 years old. Rectangular pit, no signs of covering. Relaxed hocker to the right; west-east direction, head to the west, facing south; both arms are in front of the head. Red ochre at the pelvis area. No grave inventory. ^{14}C date: SUERC-95546: 4338±22 BP (*Figs. 2.7; 4.6*).
11. ***Chudomir, barrow 1, feature 17***, Razgrad region (Alexandrov 2021a; 2021b). Primary grave. Female? 55–60 years old. Rectangular pit, flanked with tree-barks. Relaxed hocker to the right; northeast-southwest direction, head to the northeast, facing north; both arms in front of the head. Ochre lumps near the feet. Grave inventory – golden hair-ring beneath the skull; flint scraper in the feet area. Over the grave, a primary barrow fill was piled with a diameter of about 20 m and 1.40 m in height. ^{14}C date: SUERC-95540: 4446±25 BP (*Fig. 2.3–5; 4.2*).
12. ***Goran-Slatina necropolis, Barrow VII, grave 5,*** Lovech region (Kitov – Panayotov – Pavlov 1991, 90–96). Primary grave. Adult individual, no sex determination. Rectangular pit covered with wooden planks; organic cover over the pit-floor. Relaxed hocker to the left; southwest-northeast direction, head to southwest, facing north; left arm – in front of the head, right one – in front of the torso. Red ochre over the skull, ribs, left arm and feet; ochre lumps in the skull area. No grave inventory (*Fig. 6.4–5*).
13. ***Tarnak*, "*Ninovska barrow*", *grave no. 2,*** Vratsa region (Torbov 1994). Primary grave. Adult individual, no sex determination. Rectangular pit. Relaxed hocker to the right; west-east direction, head to the west, facing south; both arms in front of the head. Red ochre over the bones, especially the skull. No grave inventory (*Fig. 7.4*).

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in NAIM-BAS archive matches most of the above-mentioned criteria but, because of the lack of photos of the feature, it will be excluded from the present discussion.

14. ***Tarnava necropolis, "Glavchovska barrow", Grave no. 1,*** Vratsa region (Nikolov 1976, 40). Primary grave. Adult male. Rectangular pit covered with wooden planks. Relaxed hocker on the right side. Orientation: west-east. Red ochre over the bones. Grave inventory – clay vessel in front of the skull. Outside the pit, bones from *Bos taurus* were found (*Fig. 8.2, 5*).
15. ***Tarnava necropolis, "Glavchovska barrow", Grave No. 4,*** Vratsa region (Nikolov 1976, 41). Secondary grave. Inhumation in a rectangular pit covered with wooden planks. Position of the skeleton[10] – relaxed hocker on the right side. Orientation: south-north. Red ochre over the bones. Grave inventory – clay cup decorated with encrusted incised lines near the skull. The pit had been surrounded by stone walls, 5 m in length (*Fig. 8.1, 5*).

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[10] The grave was not illustrated. Sex and age were not mentioned as well.

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Tracing the root of cord decoration on Early Bronze Age pottery in Upper Thrace

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Abstract

For many years, researchers have discussed that pottery with cord decoration excavated from the Early Bronze Age sites of Upper Thrace in southern Bulgaria appeared alongside the expansion of the Yamnaya culture that developed in the steppe of the North and West Black Sea. Highlighting the importance of a comparative analysis of the cord-decoration technique to demonstrate the cultural root of cord-decorated pottery makers in Upper Thrace, this study examines the chronological order and typological characteristics of the initial cord decoration on pottery in Upper Thrace in the Early Bronze Age. The results reveal that small shallow bowls with fine S-twisted cord decoration emerged around 3000 cal BC in Upper Thrace. I compared the initial cord-decorated pottery in Upper Thrace with that from the archaeological entities in the Dniester–Prut interfluve and the Lower Danube valley (Cernavoda II, Coțofeni, Horodiştea-Gordineşti, Usatovo, and Yamnaya) together with their relative dates and ^{14}*C data. The analysis proves that the cord-decorated pottery of Upper Thrace did not derive from the Yamnaya culture. Instead of the Yamnaya or other cultures, this study presents a plausible alternative that the Horodiştea-Gordineşti group moved with the cord decoration technique, not with the products, to Upper Thrace. The Horodiştea-Gordineşti group did not leave much archaeological evidence, but there are marine shell products that imply interaction with the local groups in Upper Thrace. This result entails the need for further research precisely dating archaeological events related to cord-decorated pottery and considering the other archaeological materials to elucidate the migration of the Horodiştea-Gordineşti group.*

Key words: *Cord decoration on pottery, decoration technique, Early Bronze Age, Bulgaria, Upper Thrace*

Introduction

The migration of populations and the spread of innovative technology led to significant social and cultural changes that occurred in wider areas of Europe between the 4th and 3rd millennia BC. In particular, the migration of the Yamnaya population originating from the north of the Black Sea played a pivotal role. This issue related to the origin and expansion of the Indo-European group in West Eurasia has long been debated since the 1970s (e.g., Gimbutas 1970; 1977; Mallory 1989; Anthony 2007; Kristiansen *et al.* 2017). Recently, remarkable aDNA studies confirmed Yamnaya migration from the northern Black Sea grassland to the Corded Ware culture in central Europe (Allentoft *et al.* 2015; Haak *et al.* 2015), which spurred arguments on prehistoric migrations across Europe. In response to these articles by archaeogeneticists, some scholars have discussed that multidirectional, not unidirectional or single-event, interactions among archaeological entities including the Yamnaya in eastern and central Europe increasingly arose in the late 4th and the 3rd millennia BC (Heyd 2017; Furholt 2021).

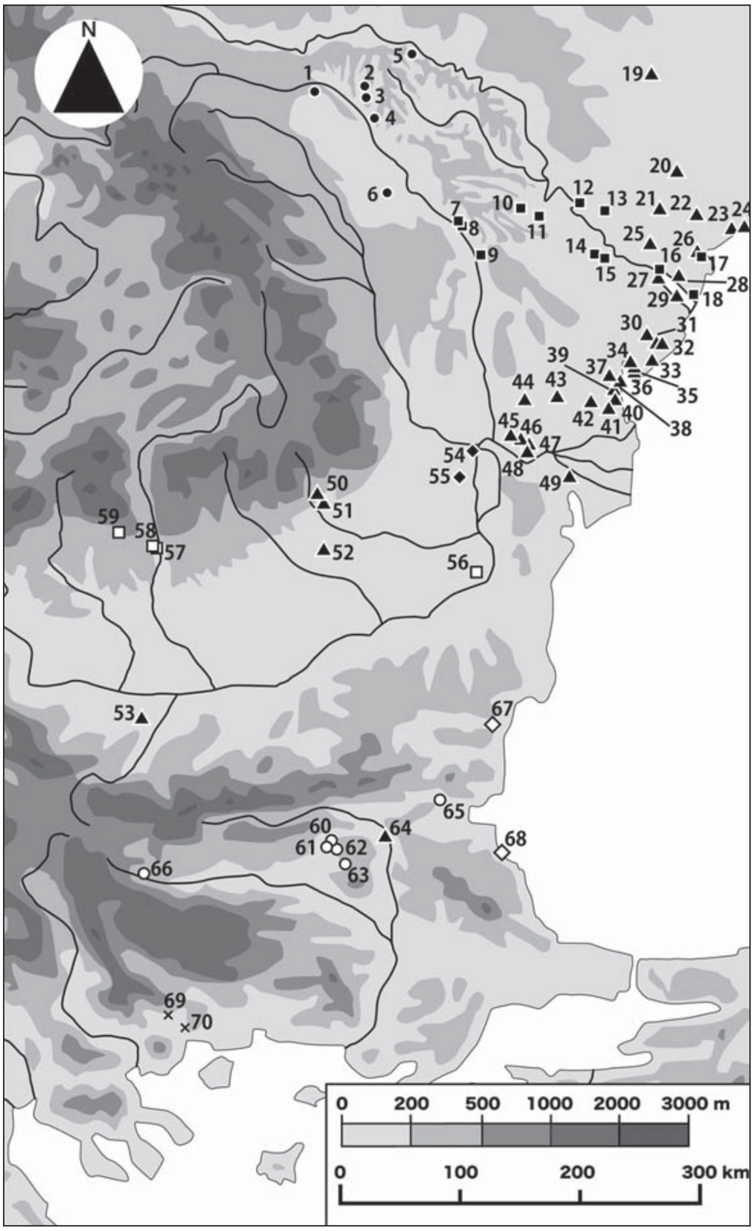

Fig. 1. Map of southeastern Europe showing the locations of sites analysed in the study.
● Horodiştea-Gordineşti group ■ Usatovo group ▲ Yamnaya culture ◆ Cernavoda II culture □ Coțofeni culture ○ EBA Upper Thracian culture ◇ Ezerovo II group × EBA Northern Greek culture
1. Horodiştea-Dealul Mălăişte, 2. Trinca-Izvoarul lui Luca, 3. Gordineşti II-Stînca goală, 4. Hancăuţi I-La Frasin, 5. Mereşeuca I-Cetăţuie, 6. Erbiceni-Dealul Sărăturii, 7. Dancu I, 8. Dancu II, 9. Sărata Răzeşi, 10. Dănceni I&II, 11. Mereni, 12. Speia, 13. Ternovka, 14. Răscăeţi, 15. Purcari, 16. Mayaki, 17. Usatovo, 18. Alexandrovka, 19. Grigor'evka, 20. Baranovo, "Soldatskaya slava", 21. Kholmskoe, 22. Holodnaya Balka, 23. Vapnyarka, 24. Sychavka, 25. Yasski, 26. Novaya Dolina II, 27. Semenovka, 28. Efimovka, 29. Mologa, 30. Sergeevka, 31. Diviziya II, 32. Alkaliya, 33. Zheltiy Yar, 34. Novoselitsa, 35. Trapovka II, 36. Vishnevoe, 37. Bashtanovka, 38. Glubokoe, 39. Strumok, 40. Neruşaj, 41. Mirnoe, 42. Chervonyi Yar I, 43. Novokamenka, 44. Kurci, 45. Frikatsey, 46. Nagornoe, 47. Plavni, 48. Gradeshka, 49. Independenţa, 50. Gurbăneşti, 51. Ploieşti-Triaj, 52. Blejoi, 53. Tarnava, 54. Brăiliţa, 55. Lişcoteanca-Movila Olarului, 56. Grădiştea-Coslogeni, 57. Ocniţa-Cosota, 58. Ocnele Mari Aval Baraj, 59. Milostea, 60. Ezero–Dipsizka mogila, 61. Dyadovo, 62. Sokol Himitliyata, 63. Ovcharitsa II, 64. Drazhevo-Sabev bair, 65. Karnobat, 66. Yunatsite, 67. Eezerovo II, 68. Kiten–Urdoviza, 69. Sitagroi, 70. Dikili Tash

Based on the evidence of ritual events in the funerary mounds (Kurgans), most researchers agree that the Yamnaya groups moved from northwest of the Black Sea to Upper Thrace (southern Bulgaria), Serbia, and Hungary (Gimbutas 1979, 127–128; Anthony 2007, 361–362; Harrison – Heyd 2007, 194; Kaiser – Winger 2015). The Yamnaya tumuli, located in the western Black Sea, are generally dated from the end of the 4th millennium BC to the middle 3rd millennium BC (Rassamakin – Nikolova 2008, 65; Ivanova 2013a, 219; Kaiser – Winger 2015, 127–128; Diaconescu 2020, 25–26). The Yamnaya materials bore diverse characteristics in each region, retaining the common funerary tradition. Moreover, the Yamnaya culture in the Bulgarian region in the Early Bronze Age (EBA) was once designated as the Lower Danube variant (Panajotov 1989). Recently, this variant has been subdivided into two distinct groups between the northern and southern Bulgarian lands because of the grave inventory (Alexandrov – Kaiser 2016, 367); thus, Upper Thrace occupies the southernmost part of the Yamnaya tumuli distribution areas known so far (*Fig. 1*).

The Yamnaya group is thought to have brought a variety of novel cultural elements into southeastern Europe as the Yamnaya package (Harrison – Heyd 2007, 196–197, Fig. 45), three elements of which were highlighted: mound, anthropomorphic stelae, and cord decoration on pottery (Heyd 2011, 546). Although the burial mounds existed prior to the emergence of the Yamnaya groups in the Bulgarian region (Alexandrov 2011, 315–316; Alexandrov – Kaiser 2016, 365–366), the first two elements have been recognized as distinctive characteristics of the Yamnaya culture. In contrast, the last one has not drawn much attention in the context of the funerary complex. One of the main reasons is that pottery with cord decoration has rarely been found in the mound graves of Upper Thrace. However, this type of pottery has been considered to appear under the direct influence of the Yamnaya migrations (Telegin 1992, 337; Harrison – Heyd 2007). On the other hand, some scholars argued that the technical skill of the cord decoration was transferred to the local population in Upper Thrace through contact with the Yamnaya (Katincharov 1974, 15–17; Georgiev *et al.* 1979, 503; Lichardus – Lichardus 1995, 51; Anthony 2007, 365; Ivanova 2014, 15). Moreover, others emphasise that one of the production centres was established after the introduction of the cord decoration, since some of the pottery was excavated from the EBA tell settlement (Dipsizka mogila) at Ezero (Nikolova 1994, 68; Leshtakov – Tsirtsoni 2016, 480).

Despite wide acceptance of existing explanations that the cord decoration was originally alien to the inhabitants of Upper Thrace, whether the cord-decorated pottery unearthed from the settlements was derived from the Yamnaya culture still warrants discussion. The excavators at Ezero indicated that the forms and decorative patterns of the EBA cord-decorated pottery prevalent in Upper Thrace were inherent to the local ceramic assemblage (Georgiev *et al.* 1979, 503). Furthermore, Petre Roman suggested that cord-decorated vessels were produced by the local Ezero groups following their own ceramic style (Roman – Dodd-Oprițescu – János 1992, 89–90). While there are repetitive arguments on the local pottery style and the allusions to the presence of the cord decoration on pottery, what seems to be required for a new approach to the cultural root is a comparative analysis of the cord-decoration technique.

To summarise, I aim to demonstrate that the cord decoration technique is effective in examining the transfer process of the cord decoration on EBA pottery in Upper Thrace and to elucidate the typological and technical characteristics of the earliest cord-decorated pottery. Examination of the stratigraphic relationship and the ^{14}C dates reveals the date of occurrence of cord-decorated pottery in Upper Thrace. By comparing the initial cord-decorated pottery from the settlements and burials in Upper Thrace with that of the Lower Danube and the Dniester–Prut valleys, this study provides evidence about when, from where, and how cord decoration on EBA pottery was brought to Upper Thrace, and proposes an alternative hypothesis to the Yamnaya-culture origin.

Cord decoration on pottery as a cultural element

Cord decoration on prehistoric pottery is an important cultural element in typo-chronological studies in southeastern Europe. The decoration is made by impressing the cord when the vessel surface is wet. Cords are prepared from plant or animal fibers and are twisted by hand or using a spindle whorl. According to ancient textile research, how to make cords depends on the cultural background to which the agents belong (Andersson Strand 2012, 31–33). Cord making is a cultural behavior, as is pottery making, so technical data of the cordage extracted from the cord impression on pottery enable us to understand the tradition of cord-decorated pottery makers. Hurley and Grömer listed analytical components to characterise cord-decorated pottery pertaining to technical skill (Hurley 1979, 5–7; Grömer – Kern 2010, 3137). Based on their lists, I focus on three attributes: cord type, twist direction, and width of impression. They have been regarded as useful to examine cultural affiliations of the makers and to understand tempo-spatial variability (Barber 1991, 65–78; Gibson – Woods 1997; 130–134; Włodarczak 2006, 83–84; Wild 2008, 470; Andersson Strand 2012, 33). Hence, analysing the technical attributes of cord decoration can provide an opportunity to reveal the transfer process in Upper Thrace.

In the study of prehistoric pottery in southeastern Europe, two types of cord decoration are usually mentioned: true and false cords (Wickelschnur) (Roman – Dodd-Oprițescu – János 1992, 31). Since the description "false cord" does not reflect the actual feature (Meyer 2008, 112), I consider the former as twisted cord and the latter as wrapped cord. The twist direction of the impression is a reversed image of the original twisted cord (*Fig. 2*). Hence, I use S and Z to designate the direction of the cord impression on pottery to avoid confusion. Although the direction of the wrapped cord can also be determined as a twisted cord, this study does not consider it in detail to facilitate the discussion.

One of the oldest examples of cord-decorated pottery in the steppes north of the Black Sea appeared in the second phase of the Sredny Stog culture in the second half of the 5th millennium BC (Kotova 2010, 105; Reingruber – Rassamakin 2016, 302–303). According to Roman's monograph (1992), contemporaneously or slightly later, the cord decoration was introduced at the Cucuteni AB stage in the eastern part of the Carpathian Mountains and in the Cernavoda I culture in the Lower Danube valley.

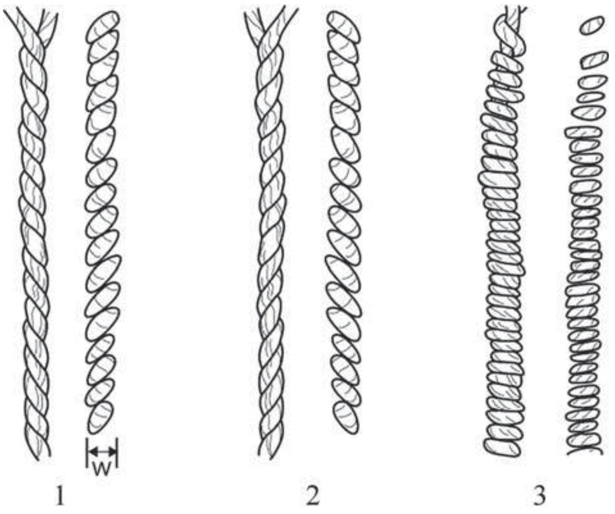

Fig. 2. Cord types and their imprints of S-twisted, Z-twisted, and Wrapped cord. 1-left: S-twisted cord, right: S-twisted cord imprint, 2-left: Z-twisted cord, right: Z-twisted cord imprint, 3- left: Wrapped cord, right: Z- Wrapped cord imprint. "w" indicates width of the imprint

In Upper Thrace, pottery with cord decoration appeared around the beginning of the EBA and was sustained up to the middle of the 3rd millennium BC. This study focuses on the earliest EBA sources to prevent the characteristics of the entire duration spanning more than 500 years from being treated as one unified ceramic type and, thus, misunderstanding the initial characteristics specific to the time of the introduction.

Early Bronze Age pottery with cord decoration in Upper Thrace

Almost all the pottery with cord decoration in Upper Thrace has been unearthed from settlement sites; only two vessels were recovered from burials. The thick cultural layers of the settlement mounds at Ezero and Dyadovo help reveal the chronological order and typological characteristics of the earliest pottery with cord decoration in the region. At these sites, each EBA cultural layer was divided into 13 and 20 building levels, respectively. *Table 1* shows the correspondence between the building levels of Ezero and Dyadovo and each stage using pottery sequences and ^{14}C dates of 40–50 samples (Görsdorf – Bojadžiev 1996; Semmoto 2021).

Table 1. Chronological chart of the Early Bronze Age in Upper Thrace showing each stage, its calibrated dates, and building levels sampled from Ezero and Dyadovo

Period	cal BC	stage	building level	
			Ezero	Dyadovo
EBA 1	3200–2900	Ezero	13–9 (Ezero A1, A2)	20–9
EBA 2	2900–2500	Mihalich	8–4 (Ezero AB, B1)	8–5
EBA 3	2500–2200	Sv. Kirilovo	3–1(Ezero B2)	4–1

According to the excavators, pottery with cord decoration appears in Ezero 11–9 and Dyadovo 14–9. No cord decoration has been observed below these building levels, other than one anomaly from the 13th building level at Ezero (Georgiev *et al.* 1979, Tab. 198). The modelled dates from Dyadovo assign the emergence of cord decoration to approximately 3000 cal BC (*Fig. 3*). The start date of Ezero 11 is within the same time span (Weninger 1995, Fig. 8; Schwenzer 2005, 186). Therefore, the ^{14}C dates allow the division of the EBA 1 in Upper Thrace into two phases by the presence or absence of cord decoration on pottery, namely EBA 1a (3200–3000 cal BC: Ezero A1) and EBA 1b (3000–2900 cal BC: Ezero A2) (*Table 1*).

Twenty-three vessels and fragments with cord decoration at Ezero, Dyadovo, and Sokol Himitliyata belong to the EBA 1b. The usual form of the cord-decorated pottery is a small shallow bowl with a slightly convex wall and sometimes with a thickened or slightly out-curved rim (*Fig. 4*). It is covered with rhombic lattice or diagonal-filled geometric patterns on both sides of the vessel's surface. It is worth noting that the S-twisted cord (n = 20, 87%) was more prevalent than the Z-twisted one (n = 3, 13%). Furthermore, the width of the S-twisted cords ranges from 1.0 mm to 2.7 mm and 85% of them fall in the fine category ranging between 1.0 mm and 2.0 mm. Thus, the small shallow bowls with complex patterns using thin S-twisted cords were characteristic of the EBA 1b (*Table 2*).

Parallels have been found in other EBA settlements at Ovcharitsa II and Karnobat and from Yamnaya burials at Drazhevo-Sabev bair (*Fig. 5*). Although they cannot be precisely dated to the EBA 1b, as there are no ^{14}C dates published, typologically their dates can be assigned to the EBA 1b or early EBA 2

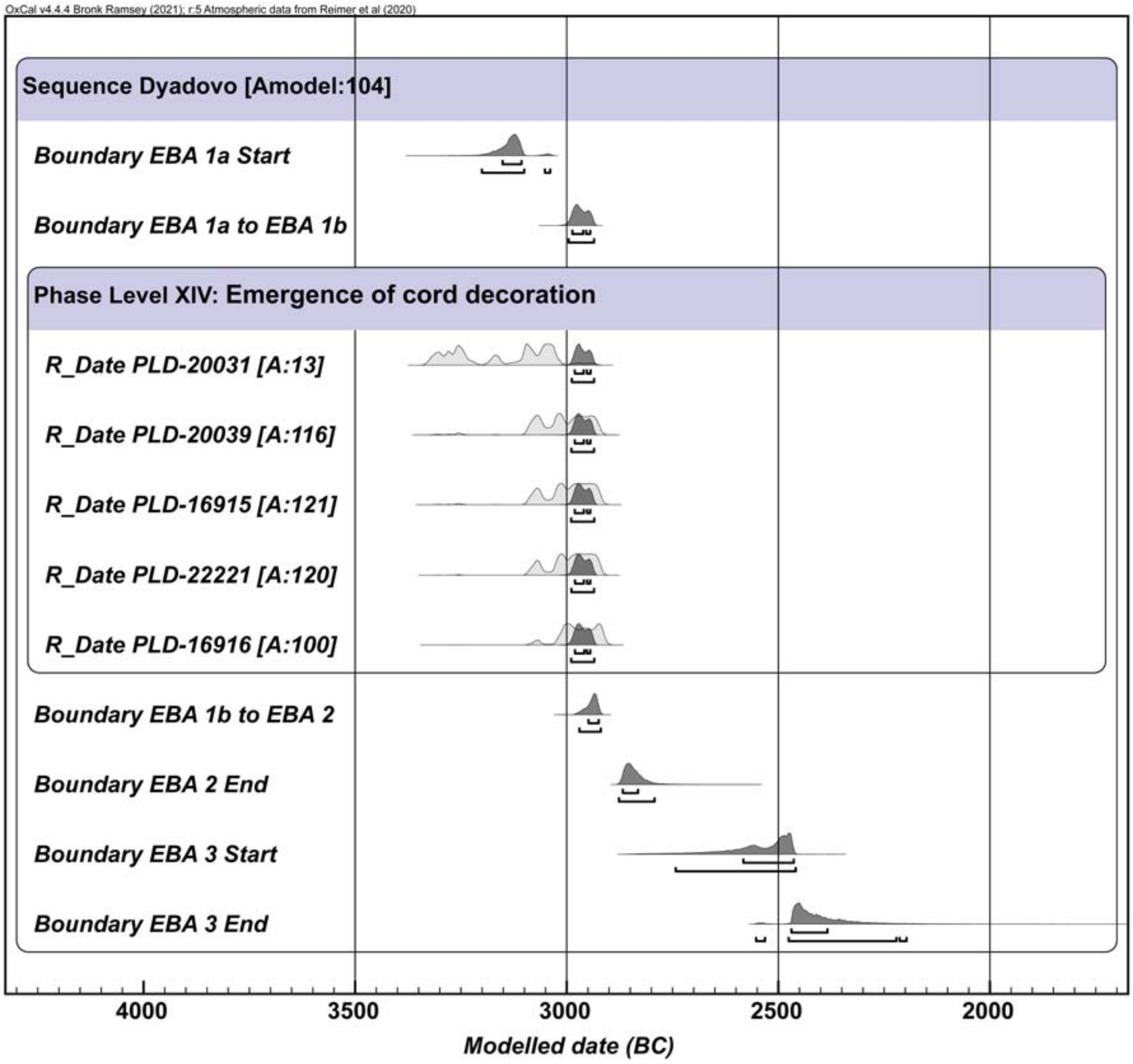

Fig. 3. Modeled calibrated dates of EBA samples from Dyadovo. EBA 1b begins with the 14th building level. The modelled dates were made by OxCal v.4.4

(Leshtakov – Kancheva-Russeva – Stoyanov 2001, 20–21; Boyadzhiev – Boyadzhiev 2016, 152; Iliev – Bakărdžiev 2020, 31–33). This means that it does not date back to before 3000 cal BC. Their spatial distribution is concentrated in northeastern Upper Thrace and they have not been found anywhere else in the plain. Later, in the EBA 2 and early EBA 3, they were replaced by shallow bowls with incurving rims and pots with simpler patterns of coarse Z-twisted cords. Finally, in the late EBA 3, the cord decoration on pottery faded away.

There is little pottery with cord decoration in western Upper Thrace (Nikolova 1996, 176). Pottery fragments with cord decoration, belonging to the EBA 2 and EBA 3, were unearthed from building levels 15–4 in Yunatsite (Mishina 2011, 70, 75). The ^{14}C and archaeomagnetic dates indicate that the lowest building level 17 began later than 3000 cal BC (Kostadinova-Avramova – Kovacheva – Boyadzhiev 2014, Tab. 1; Boyadzhiev – Aslanis 2016, 163). Of the 12 fragments I observed, 11 were Z-twisted. A similar trend of the twist direction is observed at Sitagroi Va and Dikili Tash IIIB in northern Greece,

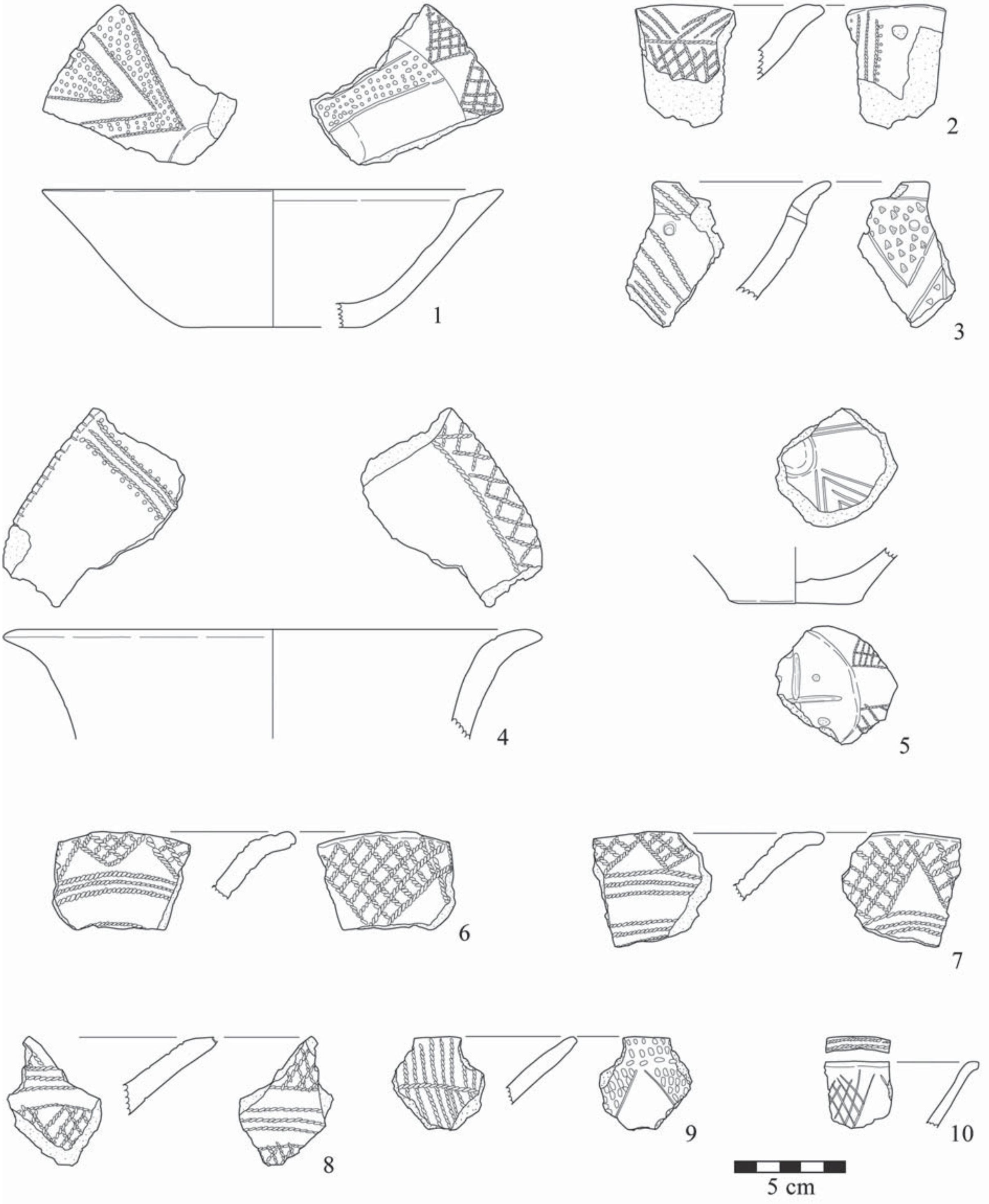

Fig. 4. Cord-decorated pottery in EBA 1b in Upper Thrace. 1–5. Ezero, 6–8. Dyadovo, 9–10. Sokol Himitliyata (drawing by the author)

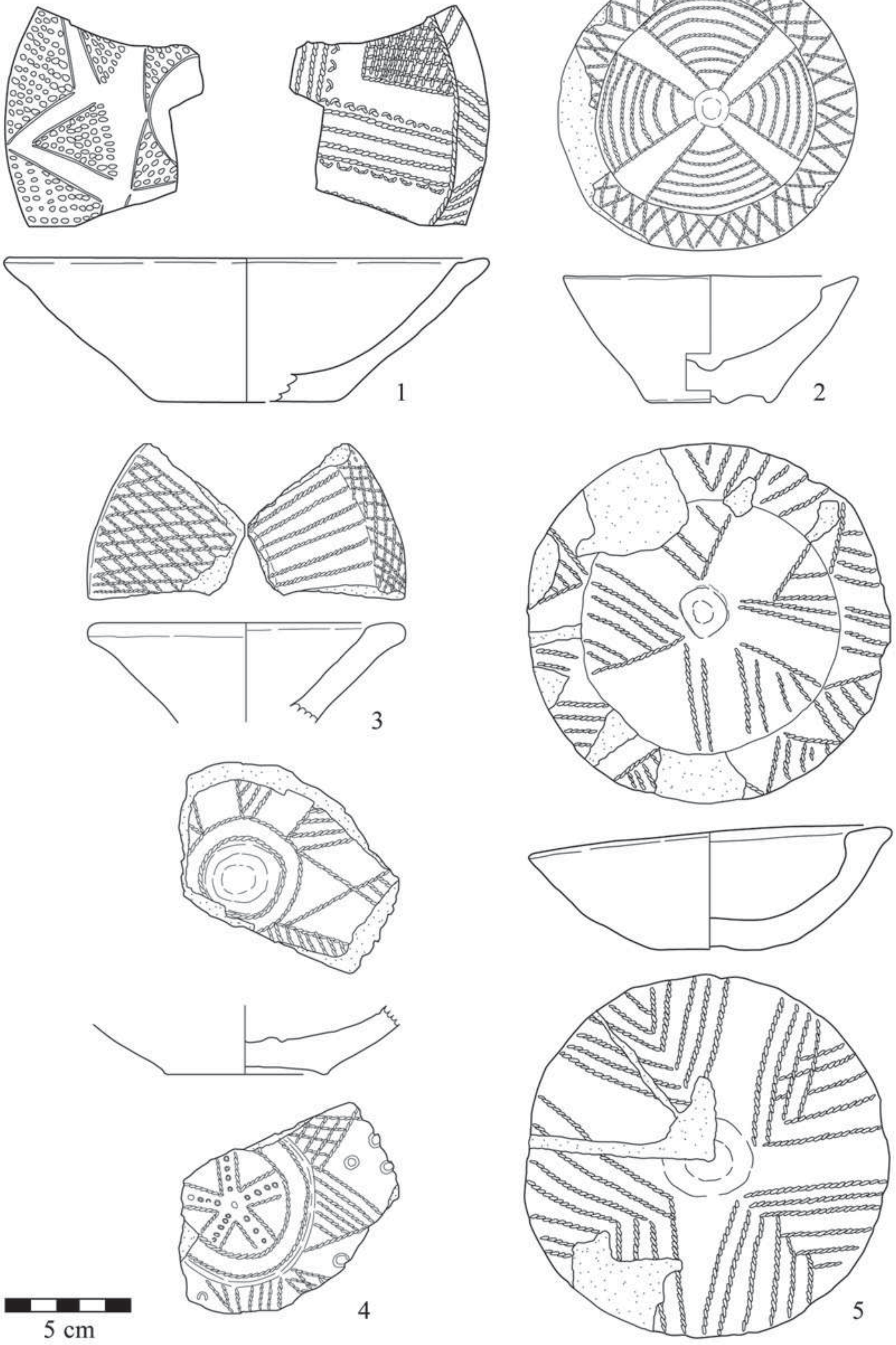

Fig. 5. Cord-decorated pottery from Ovcharitsa II, Karnobat, and Drazhevo-Sabev bair belonging to the EBA1b or early EBA 2. 1. Ovcharitsa II, 2–3. Karnobat, 4–5. Drazhevo-Sabev bair (drawing by the author)

contemporary with the EBA 2 in Upper Thrace. Thus, neither western Upper Thrace nor northern Greece is likely to be the source of the spread of the cord decoration technique to eastern Upper Thrace in the EBA.

Table 2. Ratio between S- and Z-twisted cords and amount of the fine and coarse S-twisted cords from EBA sites in Upper Thrace analysed in this study

Region	Site	Layer/Level/ Context	Sample size	S	Z	S width ≦2.0 mm	S width >2.0 mm
Eastern Upper Thrace	Ezero	Building level 11–9	16	81%(n=13)	19% (n=3)	85%	15%
	Dyadovo	Building level 14–9	5	100%(n=5)	0	80%	20%
	Sokol Himitriyata	Building level IV	2	100%(n=2)	0	100%	0%
	Okhcharitsa II	Layer I (EBA1b~2)	2	100%(n=2)	0	50%	50%
	Karnobat	Horizon 1 (EBA1b~2)	2	100%(n=2)	0	100%	0%
	Drazhevo-Sabev bair	Graves (EBA1b~2)	2	100%(n=2)	0	50%	50%
Western Upper Thrace	Yunatsite	Building level 15–4	12	8%(n=1)	92% (n=11)	100%	0%

Exploring the chronology of cord decoration on pottery west of the Black Sea

The cord decoration technique in Upper Thrace should be derived from the north. In the steppes north and west of the Black Sea, the accumulated ^{14}C dates of the Yamnaya culture indicated the period between the late 4th millennium BC and the middle 3rd millennium BC (Rassamakin – Nikolova 2008; Heyd 2011, 541; Frînculeasa 2020a, Fig. 5). New AMS dates of the Yamnaya tumuli in the Bulgarian region illustrated that the Yamnaya culture occurred simultaneously with the EBA settlements in Upper Thrace (Kaiser – Winger 2015, 127–128). Other researchers noted that pottery with cord decoration postdates 3000 cal BC in Yamnaya graves, often found in secondary burials, located in southern Romania and Transylvania (Frînculeasa – Preda – Heyd 2015, 67, Fig. 17; Diaconescu 2020, 26), despite the lack of direct ^{14}C dates of the Yamnaya graves that contained cord-decorated pottery.

A limited number of ^{14}C dates have been published for Yamnaya graves with cord-decorated pottery in the northwestern Black Sea region. Grave no. 8 with one cord-decorated vessel, exposed from the third embankment of Mayaki Mound 1, was estimated to date back to the second half of the 4th millennium BC (Ivanova – Petrenko – Vetchinnikova 2005, 124–125). The basis for this assumption was that the ^{14}C date of the sample from grave no. 9 found in the sixth embankment, posterior to grave no. 8, covered the second half of the 4th millennium BC (3500–3150 cal BC) (Ivanova 2013b, 213). However, since the age value ascribed to grave no. 9 has been questioned as being too old, the date of grave no. 8 remains unsure (Rassamakin – Nikolova 2008, 63). Apart from Mayaki, *Table 3* shows the six ^{14}C dates of the graves with cord-decorated pottery I observed. Except for grave no. 10 of Sychavka Mound 1, the date of which covers the early 2nd millennium BC, the five dates correspond to the EBA 2 or EBA 3 in Upper Thrace. In addition, two graves (nos. 16 and 18) in Semenovka Mound 8, containing pottery with S-twisted cord decoration, were built posterior to graves no. 8 and 13 (Subbotin 1985, 62–73), which were radiocarbon-dated to 3315–2916 cal BC and 3093–2911 cal BC (2σ), respectively. Thus, there is insufficient proof to demonstrate that pottery with cord decoration from Yamnaya graves in the northwestern Black Sea region coincided with the EBA 1 in Upper Thrace.

Table 3. Calibrated dates (2σ) of samples from Yamnaya graves in northwestern Black Sea region.
** shows no data about standard deviation*

Site name	Mound no.	Grave no.	Lab. No.	BP	cal BC 2σ	Reference
Efimovka	2	14	not available	not available	2750–2550*	Ivanova – Petrenko – Vetchnnikova 2005, 127
Novoselitsa	19	19	Ki-7127	4055±60	2870–2470	Ivanova – Toschev 2015, 20
Novoselitsa	19	19	Ki-7085	4180±60	2900–2580	Ivanova 2013b, Tab. 1
Sychavka	1	10	Ki-17906	3340±70	1870–1450	Ivanova 2013b, Tab. 1
Sychavka	1	15	Ki-16610	3960±80	2850–2200	Ivanova 2013c, Tab. 2
Vapnyarka	4	16	Ki-15015	4050±60	2870–2460	Ivanova – Toschev 2015, 20

Pottery with cord decoration unearthed from the Coțofeni settlements in Transylvania and Oltenia has been recognised as a chronological benchmark of the late phase (Roman 1977, 193–195; Roman – Dodd-Oprițescu – János 1992, 61; Tuțulescu – Terteci 2019, 417). The finds at Tarnava Mound 1 (Gravchovska Mogila) in northwestern Bulgaria and Silvașu de Jos Mound 3 in Transylvania demonstrated that the Coțofeni III stage stratigraphically preceded the Yamnaya burials (Alexandrov 2019, 86–87; Diaconescu 2020, 36, Fig. 3). This stratigraphic appraisal is consistent with the ^{14}C dates of both cultures not only in southern Romania but in Transylvania; the Coțofeni III stage ranges between the final third of the 4th millennium BC and the beginning of the 3rd millennium BC, and Yamnaya culture in the first half of the 3rd millennium BC (Diaconescu 2020, 23, Fig. 4; Frînculeasa 2020a, 51).

Cernavoda I–III cultures developed throughout the 4th millennium BC in the Lower Danube valley adjacent to the Coțofeni cultural area. Few sites revealed a stratigraphic relationship among the three cultures. Recent research has indicated that while the ^{14}C dates of Cernavoda I and III cultures fall in the early and middle 4th millennium BC (Gleser 2011, Abb. 7; Govedarica – Manzura 2015, 442), the Cernavoda II culture occurred synchronously with the Coțofeni III stage in the Lower Danube valley and the EBA 1 in Upper Thrace (Frînculeasa 2020a, 53).

The artifacts from the Cernavoda II culture bear witness to close connections with the submerged settlement sites, such as Ezerovo II and Kiten–Urdoviza, along the Bulgarian Black Sea coast, according to some scholars (Toncheva 1981, 60–62; Dimitrov – Draganov – Prahov 2020, 234). While the submerged settlement sites yielded a certain number of vessels with cord decoration, the ^{14}C dates fit well with the range between 2900 and 2500 cal BC (Görsdorf – Bojadžiev 1996, 157). Albeit still disputably, they could then be assigned to the EBA 2 in Upper Thrace.

Two regional groups – Usatovo and Horodiştea-Gordineşti – of the Late Tripolye culture (CII stage) are characterised by coarse ware with cord decoration and fine ware with painted decoration (Dergachev 1980; Kruts 2012). The Usatovo group consists mainly of burial mounds and flat cemeteries in the northwestern Black Sea region. The chronological order of the Usatovo group and Yamnaya culture has been attested by the inner stratigraphy of the graves in the earthen tumuli (e.g., Holodnaya Balka Mound 1, Neruşaj Mound 9, Trapovka Mound 1). Although existing radiocarbon dates of the Usatovo group are questionable and require caution (Diachenko – Harper 2016, 89; Manzura 2020, 74–75), a calibrated date range of approximately 30 selected samples could be placed into 3500–2900 cal BC (Petrenko – Kaiser 2011, 55, 57, Ris. 1; Diachenko – Harper 2016, Fig. 3, Tab. 1) and overlap with the EBA 1 dates in Upper Thrace. Chronologically, the Zhivotilovka group has been allocated between the Usatovo group and the Yamnaya culture, namely the fourth quarter of the 4th millennium BC, based on the typological parallels of the painted pottery and several ^{14}C dates (Rassamakin 1999, 92, 97; Manzura 2016, 153, 166; 2020, 76). Nevertheless, there is no detailed information on the cord-decorated pottery among the characteristic cultural elements of the group represented by the burial mounds distributed between the Lower Don and the Lower Danube valleys.

The second group, Horodiştea-Gordineşti, occupied the upper and middle Dniester–Prut interfluve to the north and mainly comprised flat settlements (Dergachev 1980, 119, Ris. 27; Ivanova – Toschev 2015, 335, Fig. 2; Diachenko – Harper 2016, Fig. 1). Since fewer archaeological data on funerary rituals have been recovered, it is difficult to find comparable evidence of the stratigraphic relationship between the Horodiştea-Gordineşti group and the Yamnaya culture. Twenty radiocarbon dates also enable the placement of this group at 3300–2900 cal BC (Diachenko – Harper 2016, 88, Fig. 3, Tab. 1; Sîrbu – Król – Heghea 2019–2020, 130, Tab. 1) and demonstrate overlaps with ^{14}C dates of the EBA 1 in Upper Thrace, similar to the Usatovo group.

Analysing cord impression on pottery

The results indicated that the dates of Coțofeni III, Cernavoda II, Usatovo, and Horodiştea-Gordineşti cover the period of the EBA 1b in Upper Thrace, while there are no positive dates for the Yamnaya burials with cord-decorated pottery except for one recently discovered at grave no. 5 of Chudomir Mound 2 in northeastern Bulgaria (Alexandrov 2021, Pl. 1). Since the absolute dates alone do not reveal the cultural interrelation between Upper Thrace and the above archaeological entities, it is necessary to clarify the relationship between them by comparing their data of the cord decoration technique (*Table 4*).

*Table 4. Sample size and relative frequencies of cord types observed on vessels or fragments with cord-decoration of the archaeological entities examined in this study. * indicates that seven samples were counted twice because each specimen had two multiple cord types*

Archaeological entity	Site	Context	Sample size	Wrapped	Wrapped&Z	Z	S	Z&S
Yamnaya (western Black Sea)	5	Graves	9	0%	0%	67%	33%	0%
Yamnaya (northwestern Black Sea)	30	Graves	60*	0%	0%	50%	40%	10%
Coțofeni	4	Settlements & Graves	32	31%	0%	44%	25%	0%
Cernavoda II	2	Graves	5	20%	0%	40%	20%	20%
Usatovo	13	Graves	97	16%	31%	52%	1%	0%
	1	Settlement	1430	43%	28%	29%	0%	0%
Horodiştea-Gordineşti	6	Settlements	200	0%	0%	6%	94%	0%

Most pottery vessels with cord decoration discovered in Yamnaya burials in the Lower Danube valley are beakers, pots, and Budzhak pots with simple motifs (*Fig. 6*) (Frînculeasa – Preda – Heyd 2015, Fig. 13). Of the nine vessels, six vessels from graves no. 4, 6, and 8 of Independenţa Mound 4, grave no. 15 of Ploieşti-Triaj Mound 2, and graves no. 3 and 4 of Gurbăneşti Mound 2 (Rosetti 1959, Fig. 8) were decorated with Z-twisted cord. In addition, three vessels with S-twisted cord decoration were found in Yamnaya burials: grave no. 20 of Ploieşti-Triaj Mound 2, and grave no. 2 of Blejoi Mound 4, and grave no. 1 of Tarnava Mound 2. For Ploieşti-Triaj, the width of the S-twist was very

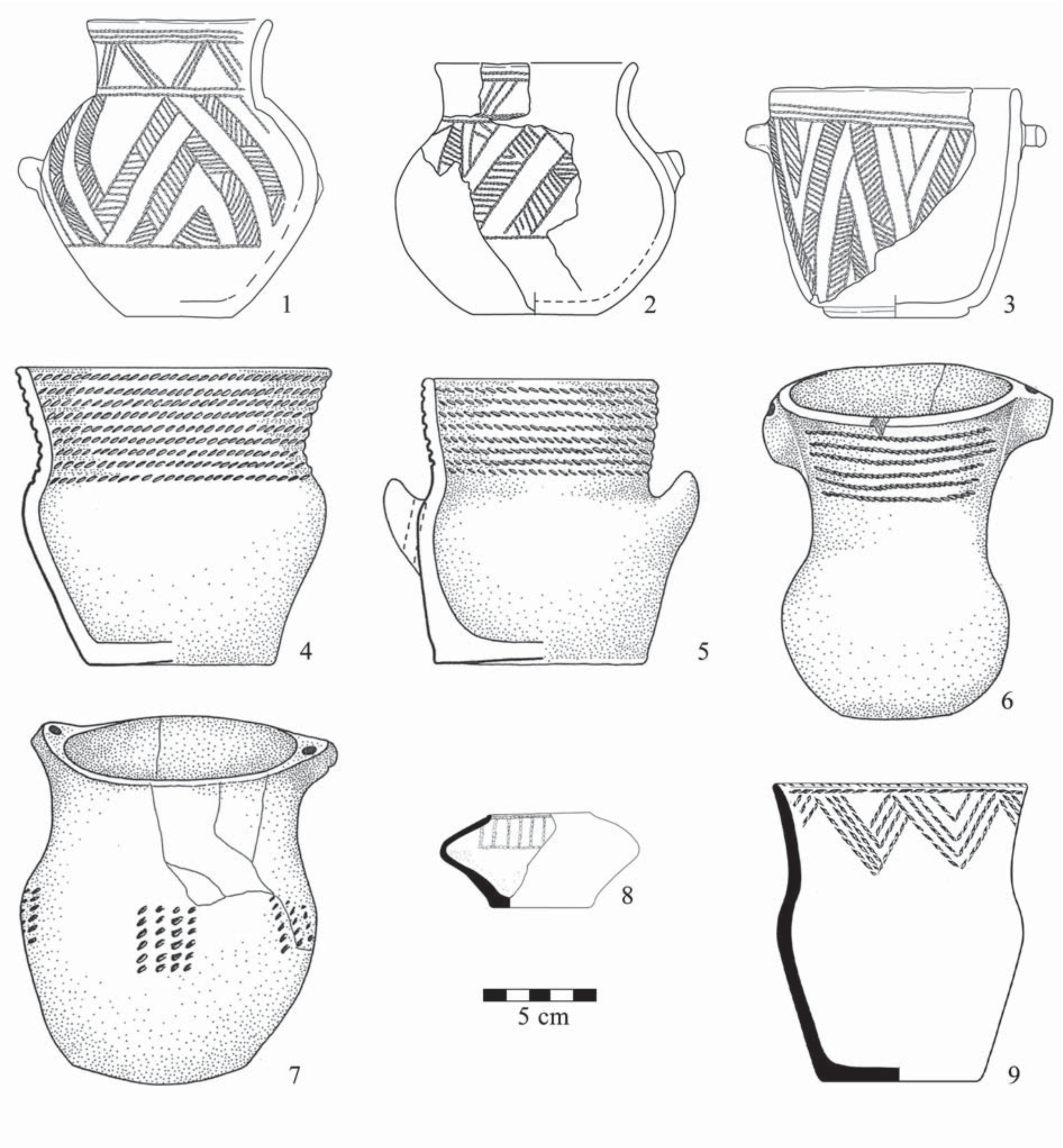

Fig. 6. Cord-decorated pottery of Yamnaya culture in the western Black Sea region. 1. Independenţa Mound 4, grave no. 8, 2. Independenţa Mound 4, grave no. 6, 3. Independenţa Mound 4, grave no, 4, 4. Ploieşti-Triaj Mound 2, grave no. 20, 5. Ploieşti-Triaj Mound 2, grave no. 15, 6. Gurbăneşti Mound 2, grave no. 4, 7. Gurbăneşti Mound 2, grave no. 3, 8. Blejoi Mound 4, grave no. 2, 9. Tarnava Mound 2, grave no. 1 (1–3. drawn by the author, 4–7. after Roman – Dodd-Opriţescu – János 1992, Taf. 64: 1, 2, 5, 8. after Frînculeasa et al. 2019, Pl. VIII: 6, 9. after Alexandrov 2019, Pl. VII: 9)

coarse–3.6 mm. Although I did not measure the width for Blejoi and Tarnava, the cord appeared coarse (Frînculeasa *et al.* 2019, Pl. VIII: 5).

Yamnaya burials in the northwestern Black Sea region have yielded more pottery with cord decoration (*Fig. 7*) (Subbotin 2000, 362, Ris. 4; Ivanova 2013b).

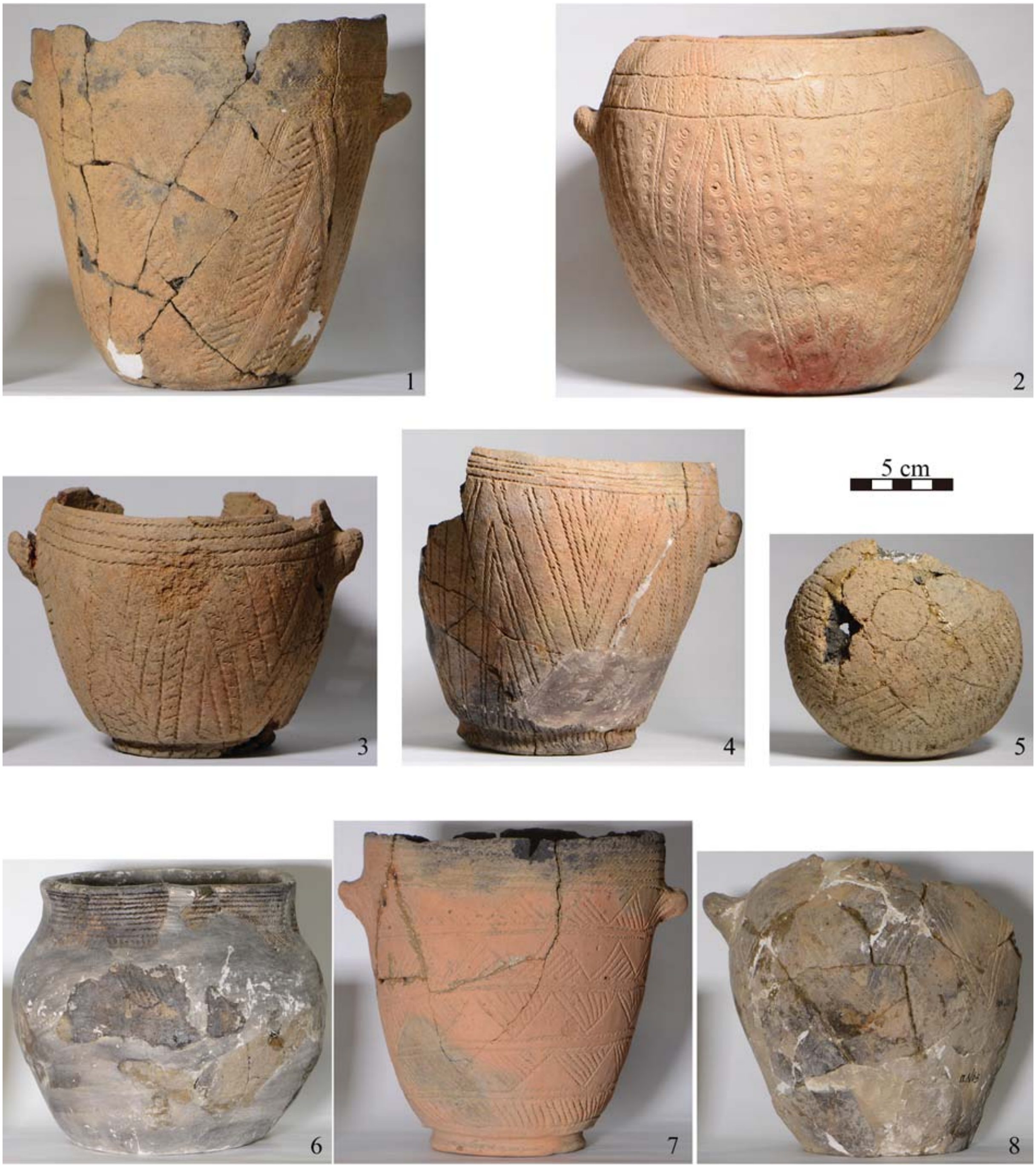

Fig. 7. Cord-decorated pottery of Yamnaya culture in the northwestern Black Sea region. 1. Sergeevka Mound 11, grave no. 7, 2. Efimovka Mound 2, grave no. 14. 3. Sychavka Mound 1, grave no. 15, 4. Chervonyi Yar Mound 1, grave no. 2, 5. Kurci Mound 3, grave no. 8, 6. Glubokoe Mound 2, embankment layer, 7. Semenovka Mound 8, grave no. 18, 8. Vishnevoe Mound 11, grave no. 4 (photograph by the author)

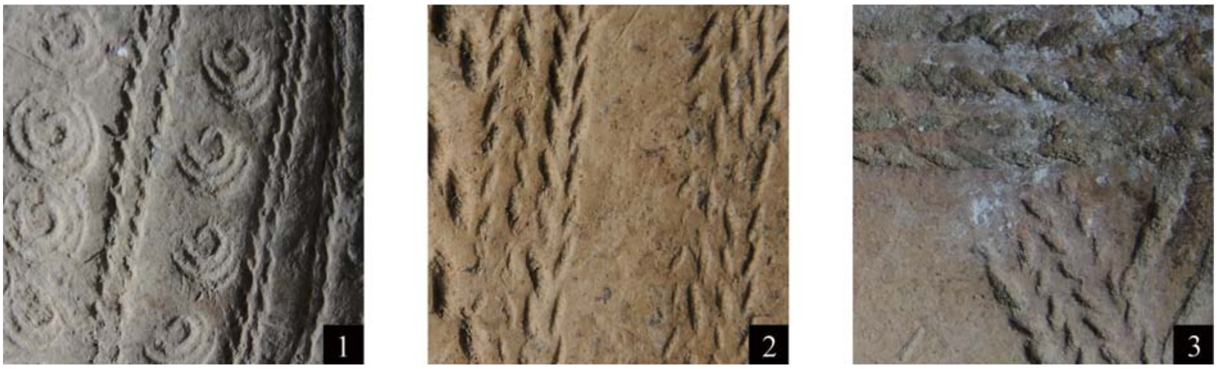

Fig. 8. Bundle-cord decoration on pottery of Yamnaya culture. 1. Efimovka Mound 2, grave no. 14, 2. Sergeevka Mound 11, grave no. 7, 3. Frikatsey Mound 10, grave no. 14 (photograph by the author)

Eleven of 53 vessels from 30 Kurgans employed bundle-cords (*Fig. 8*). Six of these vessels were decorated with bundle-cords consisting of different S- and Z-twisted cords, and the other five with bundle-cords of the same twist direction, each consisting of four S-twisted and one Z-twisted cords. In addition, one Budzhak pot from grave no. 7 of Sergeevka Mound 11 was decorated with bundle-cord consisting of different S- and Z-twisted cords and another was decorated with Z-twisted cord (*Fig. 8.2*). A total of 60 data points on the twist direction and width of the cord obtained from 53 vessels indicated that there was no significant difference in the ratio between Z- and S-twisted cords. The width of the S-twisted cord ranged from 1.1 mm to 3.1 mm and the average value was about 2.0 mm.

When examining the Coțofeni culture, I observed 32 fragments from four sites. Of these, 28 were from Ocnele Mari *Aval Baraj* in Oltenia, and one or two fragments came from the other three sites: Ocnița-Cosota, Milostea, and Grădiștea-Coslogeni. I assigned the find from Grădiștea-Coslogeni located in Muntenia to the Coțofeni-style (Frînculeasa 2020a, 52). All the vessels can be dated to the Coțofeni III stage (Tuţulescu 2016, 207–208; Frînculeasa 2020a). The characteristic of this stage is the pots and cups with the hatched-triangle motif. Fourteen fragments had Z-twisted cords, followed by ten fragments with wrapped cord and eight with S-twisted cord (*Fig. 9.1–4*). Most of the S-twisted cords were more than 2.0 mm wide, with an average of 2.25 mm.

In contrast to the Cernavoda I culture, cord decoration is much rarer in the Cernavoda II culture (Frînculeasa 2020b, 157). Five vessels with cord decoration around the early 3rd millennium BC were recovered from two flat cemeteries (*Fig. 9. 5–8*) (Frînculeasa 2020b, 157). At Brăiliţa, two beakers and one handled-bowl with horizontal lines and/or zigzag patterns were found in three burials (graves no. 8, 34, 144). The vessels in graves no. 8 and 144 were decorated with Z-twisted cord and that in grave no. 34 with wrapped cord. At Lişcoteanca-*Movila Olarului*, two vessels with multiple wavy lines or arches were excavated from graves no. 1 and 4. An S-twisted cord was visible on the pottery from grave no. 1, and S- and Z-twisted cord on that from grave no. 4. Two S-twisted cords measured 1.5 and 2.4 mm in width.

For the Usatovo group, I observed 97 vessels from 13 burial sites and 1430 fragments from a settlement at Usatovo. Spherical pots and jars with crescent motifs and horizontal linear patterns were typical of the Usatovo group (*Fig. 10*). Although the wrapped cord also made up a large proportion of the cord type and the bundle-cord of the same twist direction was observable, it is noteworthy that the cord-decorated pottery of the Usatovo group was almost entirely dominated by Z-twisted cord when compared to the presence of S-twisted cord (*Table 4*).

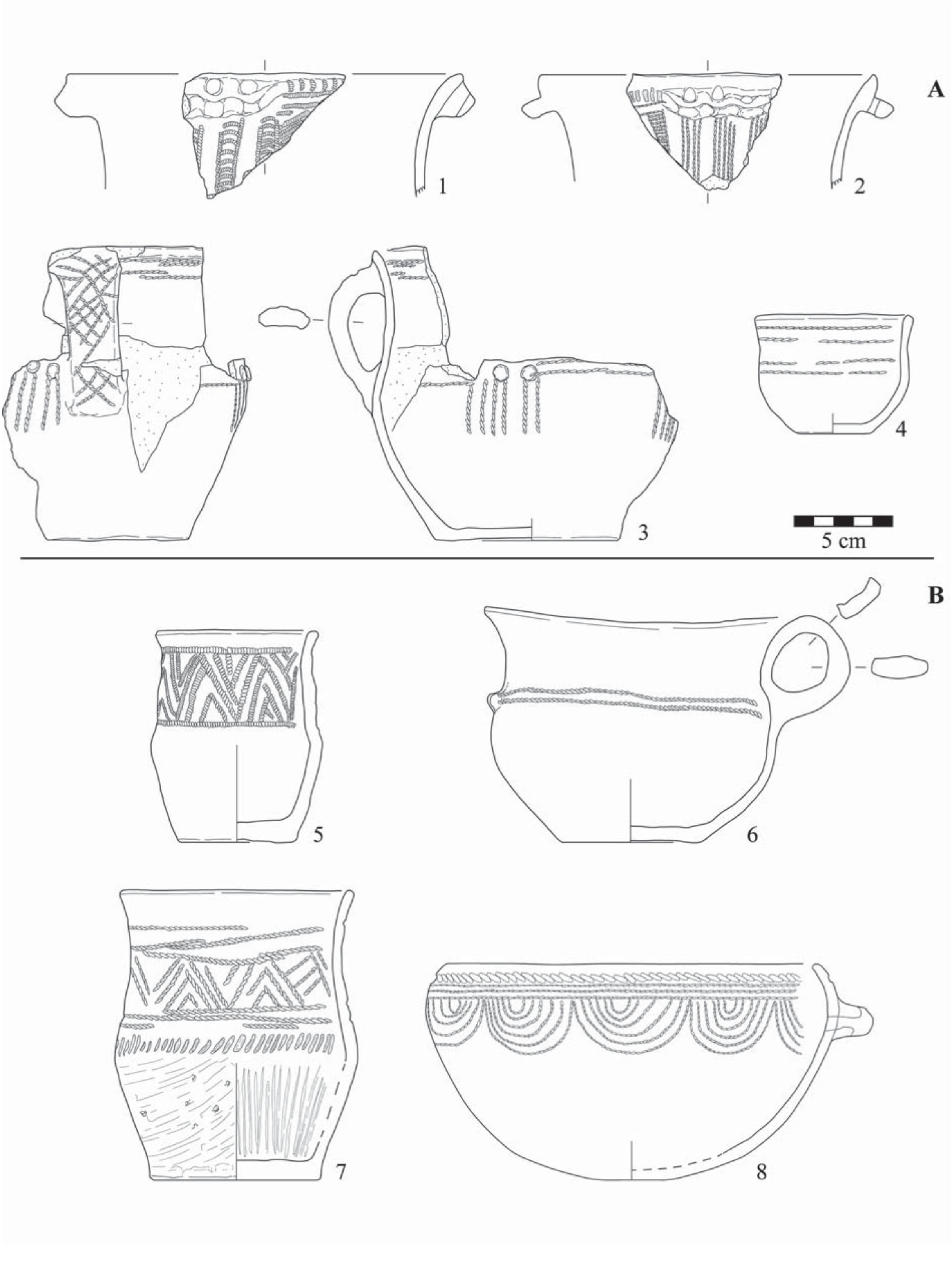

Fig. 9. Cord-decorated pottery of Coțofeni III and Cernavoda II cultures. A. 1. Ocnele Mari Aval Baraj, 2. Ocniţa-Cosota, 3– 4. Grădiştea-Coslogeni, B. 5. Brăiliţa grave no. 34, 6. Brăiliţa grave no. 144, 7. Brăiliţa grave no. 8, 8. Lişcoteanca grave no. 4 (drawing by the author)

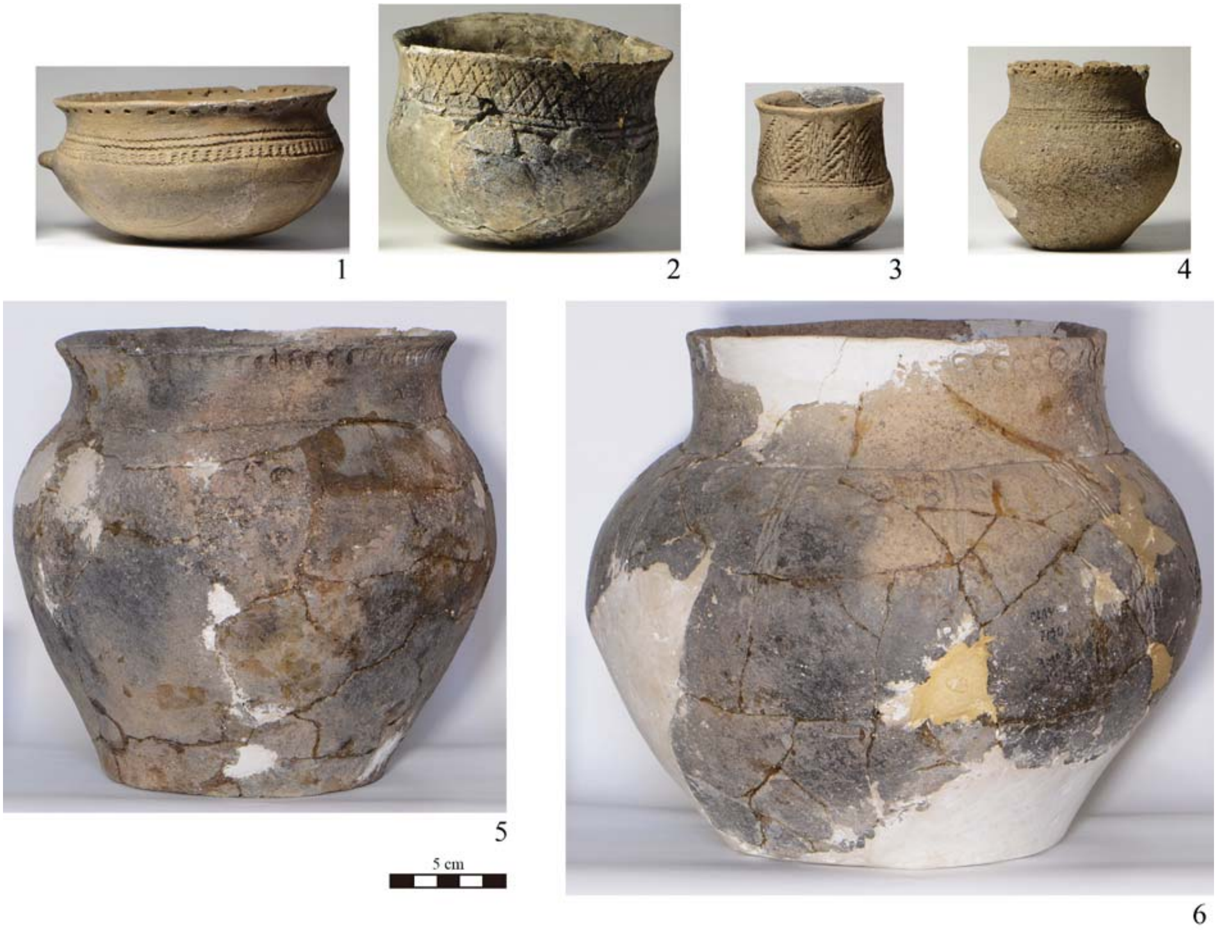

Fig. 10. Cord-decorated pottery of Usatovo group. 1. Usatovo, Kurgan Complex II, Mound 9, grave no. 2, 2. Usatovo, Kurgan Complex II, Mound 9, grave no. 1, 3. Usatovo, Flat Cemetery no. 3, ritual pit no. 2, 4. Usatovo, Kurgan Complex II, Mound 6, grave no. 4, 5. Usatovo, Kurgan Complex I, Mound 12, grave no. 1, 6. Usatovo, Kurgan Complex I, Mound 12, grave no. 3 (photograph by the author)

For the Horodiştea-Gordineşti group, I observed 200 fragments from six settlement sites. Typically, the shallow hemispherical bowls with thickened rims display linear patterns (*Fig. 11*). In sharp contrast to the Usatovo group, there is no evidence of wrapped cord. Moreover, most are S-twisted (94%), and the rest Z-twisted (6%). S-twisted cord-width ranges from 0.9 to 3.2 mm, and approximately 70% belong to the "fine" category (≦2.0 mm).

Discussion

This study analysed the cord decoration on pottery regarding cord type, twist direction, and width in southeastern Europe. The results indicated that the Coțofeni and Cernavoda II cultures of the Lower Danube valley have no strong connections with Upper Thrace. Although the analysed materials do not necessarily represent all the characteristics of the Coțofeni culture, it is possible to find clear distinctions from those of Upper Thrace; namely, the wrapped cord seen in the Coțofeni III stage is not typical in the Upper Thrace. The S-twisted cords are least prevalent in Coțofeni III, and the width of the S-twisted

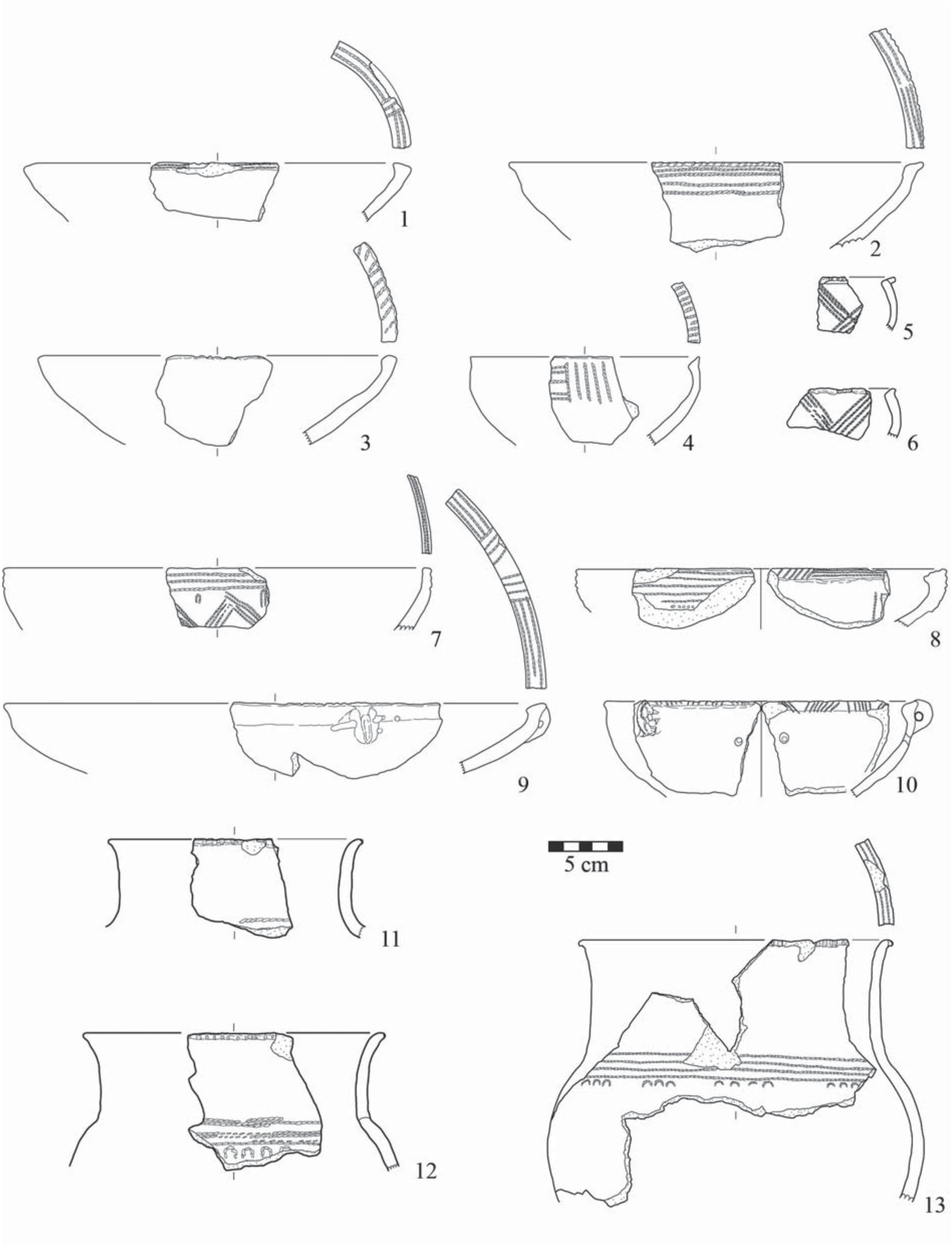

Fig. 11. Cord-decorated pottery of Horodiştea-Gordineşti. 1, 3, 4, 12. Gordineşti II-Stînca Goală, 2, 13. Trinca-Izvorul lui Luca, 5, 6. Erbiceni-Dealul Sărăturii, 7. Mereşeuca I-Cetăţuie, 8–11. Horodiştea-Dealul Mălăişte (drawing by the author)

is coarser than that in the Upper Thrace. The analysed cord decoration in the Coțofeni culture hardly postulates any connections between the Coțofeni and the Thracian cord decoration.

Moreover, the Cernavoda III culture was not relevant to the root of the Thracian cord decoration because this entity predates the Cernavoda II culture and does not overlap with the EBA 1b in Upper Thrace. Furthermore, due to the difference in cord decoration technique, cord-decorated pottery from three graves at Brailița, of the Cernavoda II culture, have no connection with that of Upper Thrace. While the S-twisted cord decoration of grave no. 1 at Lișcoteanca is coarse, the cord decoration of grave no. 4 is fine (1.5 mm). Some suggested that graves no. 1 and 4 of Lișcoteanca belong to the younger Katacombnaya culture (Ivanova 2013b, 244; Ailincăi *et al.* 2021, 225). Given the fore-going evidence, the cord decoration of Cernavoda II culture is unlikely to be the prototype of the Thracian cord decoration.

The cord decoration of the Usatovo group in the northwestern Black Sea region is also not comparable to that of Upper Thrace. The wrapped cord comprises a certain ratio of the cord types of the Usatovo group, such as the Cernavoda I and Coțofeni cultures. More importantly, it should be emphasised that the Z-twisted cord was exclusively employed. The main features of the cord decoration technique clearly distinguish the Usatovo group from Upper Thrace. Thus, it is possible to argue that the Usatovo group has little to do with the cord-decorated pottery of the EBA 1b in Upper Thrace.

The Yamnaya culture in the western Black Sea region has only a few S-twisted cord decorations on pottery: three vessels and fragments from Ploieşti-Triaj, Tarnava, and Blejoi were dated to the 3rd millennium BC (Frînculeasa – Preda – Heyd 2015; Alexandrov 2019, 88; Frînculeasa *et al.* 2019, 48). Their coarser cords do not positively support the interrelationship with the fine S-twisted cord decoration of Upper Thrace in the EBA 1b.

Although the northwestern Black Sea region yielded more pottery with cord decoration than the western Black Sea region, there is little reliable evidence that the cord decoration was brought to Upper Thrace in the EBA 1b. The ^{14}C dates of the five burials found in the Yamnaya tumuli with cord-decorated pottery indicated age values of the EBA 2, EBA 3, and even younger, regardless of the twist direction. Hence, these ^{14}C dates do not support the interpretation that the Yamnaya groups brought the cord decoration on pottery to Upper Thrace.

Another reason the Yamnaya culture cannot be considered suitable is the difference in the cord decoration technique. While Upper Thrace in the EBA 1b is characterised by the predominance of fine S-twisted cord decoration, the Yamnaya cord decoration shows a similar ratio of S-twisted and Z-twisted cords. Seventeen of 27 samples (63%) of the S-twisted are thin cords of 2.0 mm or less. Ten of them were on Budzhak pots and spherical jars with bundle-cord decoration. Although the pottery decorated with the bundle-cord technique is occasionally encountered in the Usatovo group and the Katacombnaya culture of the northwestern Black Sea region, and in the Corded Ware culture (Ivanova 2013c, 111), there is no proof thereof in Upper Thrace. In addition to the relationship with the Usatovo group as mentioned earlier, the chronological position of the Corded Ware and Katacombnaya cultures coincides with the EBA 2 and EBA 3 in Upper Thrace (Furholt 2004, 485–486; Włodarczak 2006, Fig. 54). Therefore, arguments based on the bundle-cord technique of the Yamnaya culture do not favor the spread of the cord decoration technique into Upper Thrace.

Two vessels of the remaining seven data samples were from burials with ^{14}C dates between 2850–2200 cal BC (grave no. 14 of Efimovka Mound 2 and grave no. 15 of Sychavka Mound 1). The other five vessels (grave no. 2 of Chervonyi Yar Mound 1, embankment layer of Glubokoe Mound 2, grave no. 8 of Kurci Mound 3, grave no. 18 of Semenovka Mound 8, grave no. 4 of Vishnevoe Mound 11) can also be dated later than 3000 cal BC (*Fig. 7*). First, the pottery from Glubokoe Mound 2 has decorations with a combination of triangles filled with oblique lines under the multiple lines arranged from the rim to the shoulder, parallels of which have been found not only in the Yamnaya culture but in the Katacombnaya and Corded Ware cultures (Pustovalov 1999, Ris. 10: 9, 10, 12; Włodarczak 2006, Pl. LXXVIII:4, LXXXII:1). In Semenovka Mound 8, pottery with cord decoration from grave no. 16 constructed in the same stratigraphic layer as grave no. 18 was found with a stone shaft-hole hammer-axe as grave goods analogous to the production in the Corded Ware culture (Ivanova 2013b, 243). The star-shaped motif on the bottom of the cord-decorated vessel from grave no. 8 of Kurci Mound 3 is similar to that of the Katacombnaya culture, for example, in grave no. 12 of Holodnaya Balka Mound 1 (Petrenko 2010, Tab. 6:2). Grave no. 4 of Vishnevoe Mound 11, dug in from the upper part of the fourth embankment layer, was set above the Yamnaya graves and ascribed to the Mnogovalikovaya Pottery culture (Dvorjaninov – Dzigovskij – Subbotin 1985, 137). The Budzhak pot from grave no. 2 of Chervonyi Yar Mound 1 has a characteristic “ledge” between the bottom and lower part of the inside. Parallels are observable in grave no. 5 of Yasski Mound 2, grave no. 15 of Nagornoe Mound 14, and grave no. 3 of Novaya Dolina Mound 3. Notably, the ^{14}C date (Ki-17902) of wooden wheels recovered from grave no. 2 of Yasski Mound 2 (Alexeeva 1992) falls within the range of 2860–2470 (2σ) (Ivanova 2013c, 119–120, Tab. 1). Because the Yamnaya grave (no. 2) was constructed in the embankment heaped on the primary burial of the late Chalcolithic period, grave no. 5 of Yasski Mound 2 is likely to be contemporary with or later than grave no. 2. Thus, the Budzhak pots with the inner “ledge” imply that the graves of Chervonyi Yar Mound 1 and Yasski Mound 2 can be dated to the second or third quarter of the 3rd millennium BC.

As indicated above, the prevailing explanation that the cord decoration in Upper Thrace originated from the Yamnaya culture lacks conclusive evidence in the western and northwestern Black Sea region. It appears that the Yamnaya culture was not relevant to the emergence of pottery with fine S-twisted cord decoration in the EBA 1b of Upper Thrace. Instead, the Horodiştea-Gordineşti group of the Tripolye culture (CII stage) remains an affirmative archaeological entity because of the overlapping ^{14}C dates and similar characteristics to the cord decoration technique. However, the Horodiştea-Gordineşti group did not make small shallow bowls with oblique lattice-filled geometric patterns, similar to the Upper Thracian group. This demonstrates that the Horodiştea-Gordineşti group did not transport the pottery with cord decoration to Upper Thrace but transmitted the cord decoration technique.

This supposition raises another question: How did the cord decoration technique reach Upper Thrace? The Horodiştea-Gordineşti group, who did not follow tumulus burial practices, left little archaeological evidence, except for the cord decoration on pottery, between the Dniester–Prut river valley and Upper Thrace. Notwithstanding, there are a few positive findings that imply human mobility over long distances. A good example is marine shell beads, probably *Dentalium* shells, found in the Gordineşti-style vessel at Tsviklovtsy in the upper Dniester valley (Ivanova – Toschev 2015, 342; Frînculeasa 2020a, 46). Other *Dentalium* shell products from the Tripolye CII stage have been spotted along the Lower Danube valley (Frînculeasa 2020a, 46). The distribution of these marine shell products proves that various cultural contacts occurred between the upper Dniester River basin and the Aegean Sea. Such archaeological records, including funerary evidence, indicate the presence of other cultural groups that migrated from the northwestern Black Sea region to the Lower Danube valley, Upper Thrace, and possibly the northern Aegean region in the 4th millennium BC, before the arrival of the Yamnaya culture (Anthony 2007, 354; Alexandrov 2011; Alexandrov – Kaiser 2016, 366; Frînculeasa – Mirea – Trohani 2017, 86–88; Coleman – Facorellis 2018). In the process of mutual communication, the Horodiştea-Gordineşti group interacted with the Upper Thracian groups, resulting in the spread of the cord decoration to Upper Thrace.

The explanation that the local potters of Upper Thrace precisely imitated even the direction and width of the cord impression to decorate their pottery is perhaps debatable. The production process of cord-decorated pottery has not been fully elucidated because there is no published information about the original cord itself or the workshops at the EBA sites in Upper Thrace. However, the characteristics of the pottery paste shed new light on the production of small shallow bowls with cord decoration. Petrographic and chemical analyses indicated that the small shallow bowls with S-twisted cord decoration from the EBA 1b building levels at Dyadovo and Sokol Himitliyata were made with different clay pastes from the local-style pottery in each settlement (Semmoto *et al.* 2018, 156–157). This leaves room for the interpretation that the small shallow bowls with fine S-twisted cord decoration were made from different raw materials and at places separate from the local pottery production in the EBA 1b, although further research is required.

Conclusion

This study discusses the emergence of cord decoration on EBA pottery in Upper Thrace, focusing on the chronological dates and typological characteristics, especially the cord decoration technique. The investigation of the cord-decorated pottery of Upper Thrace establishes that it did not originate from the Yamnaya culture. Instead, I propose a plausible alternative. It is highly probable that the southward migration of the Horodiştea-Gordineşti group caused interactions with the local groups in Upper Thrace, with the result that the group from the Dniester–Prut river valley disseminated the fine S-twisted cord technique only and not any actual products to Upper Thrace. The faint traces of the Horodiştea-Gordineşti groups in Upper Thrace may raise doubt that the cord-decoration technique alone can prove the connection between the two groups. However, the marine shell products stored in the Gordineşti-style pottery evidently illustrated contact between the Horodiştea-Gordineşti group and inhabitants of the southern Balkans. This may mean that the Horodiştea-Gordineşti group was also one of the groups that traveled long distances in southeastern Europe.

I presumed the Horodiştea-Gordineşti group as the archaeological entity that brought the first cord decoration on pottery to Upper Thrace. One of the reasons why this interpretation is more plausible is that, regardless of the characteristics of the cord for decoration, no data with sufficient ^{14}C dates have emerged among the Yamnaya burials with cord-decorated pottery in the northwestern and western Black Sea regions except the up-to-date findings at Chudomir. As the number of high-precision ^{14}C dates increases, it is necessary to consider the possibility that the Yamnaya population introduced the cord decoration technique to other groups. Discussing the theme is beyond the scope of this study, but the data of the Lower Danube valley do not seem to rule out its possibility. The dispersal of the cord decoration on pottery through migrations in the northwestern and western regions of the Black Sea from the late 4th to early 3rd millennium BC must have been more complex than expected.

As convenient as it may sound, there is no testimony that reveals the background of the Horodiştea-Gordineşti group moving south with the cord decoration. One may think of the decline and collapse of the Tripolye culture in the northwestern Black Sea region around 3000 cal BC. However, there are numerous issues that require investigation before we can reveal the causality between the collapse of the Tripolye culture and the migration of the Horodiştea-Gordineşti group. Furthermore, it is challenging to discuss the aDNA background, owing to the insufficient burial data of the EBA local groups in Upper Thrace. The conclusions of this study are still hypothetical and require further data accumulation and verification. Hence, in addition to further analysis of the cord-decorated pottery, we need to continue to work on precisely dating archaeological events and on approaches from other archaeological materials.

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Foreign-local interactions during the Early Bronze Age in the valley of Tundzha River and the new ways of presenting prestige

TODOR VALCHEV

Abstract

The first half of the 3rd millennium BC was one of the most dynamic and interesting periods in Balkan history. This is the time of migration of people, transfer of technological know-how, exchange of ideas and innovations, and cultural influence. During this time, in the valley of the Tundzha River, the migrating communities of the Yamnaya culture came into contact with the local population – the communities of the Ezero culture. The aim of this paper is to present the new ways of representing the prestige in prehistoric society during the Early Bronze Age. During this period, personal skills were very important and supported accumulation of authority and prestige. Prestige was also marked by the purchase and use of special objects (like weapons and personal adornments). During the Early Bronze Age, the local population in the valley of the Tundzha River adopted and developed innovations – new ways to present prestige by the communities of Yamnaya culture. Some of them are burial mounds – a new, different way of treating the dead and worshiping venerated relatives and ancestors; spiral hair rings made of silver that were worn by children and adults on the most visible area of the human body – the face; and bronze daggers – which have played an important role in the ideals of masculinity and heroism.

Key words: *Yamnaya culture, prestige, burial mound, spiral hair ring, dagger*

Introduction

In the second half of the 4th millennium BC in the Balkan Peninsula, a new age began. This period of development is characterized by the emergence of a new technology – the smelting of bronze[1]. This new material enabled the prehistoric smiths to make different types of tools and weapons. In addition, they were able to copy any object, including imported ones, and to give them individual characteristics. As a rule, cast and forged bronze objects are unique products. For nearly 2500 years this new technology has dominated and shaped Eurasia and the Mediterranean Sea.

Aside the introduction of bronze smelting, Bronze Age is also known as a period of intensive movement and migration. People traveled between distant areas and exchanged their productions, ideas, innovations, and beliefs. At the same time, new ways for presenting prestige spread. As I will show in this paper, the purchase and use of special objects (such as weapons and personal adornments) is present also in the archaeological record. This indicates that personal skills played a significant role in the accumulation of authority and prestige.

Aside bronze technology, human migrations and evidence of long-distance exchange networks, Early Bronze Age is also marked by a complex social hierarchy. At this time, new prestige symbols such as burial mounds, silver hair rings, and bronze daggers were used. These innovations originated in the North Black Sea and Caucasian areas and spread across vast areas in Europe. During the migration of the communities of the Yamnaya culture, the new prestige symbols reach the valley of Tundzha River, where they have been accepted, adopted, and further developed by the local population.

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[1] Bronze is an alloy of copper (Cu) and arsenic (As) or copper (Cu) and tin (Sn).

The migrations in the 4th – 3rd millennia BC

The history of human society is the history of movement and contact. There are migrations in which thousands of people travel for decades in search for the optimal condition of life and a new homeland. However, incoming people do not enter completely empty, uninhabited areas, and accordingly, the relationships between "local" and "foreign" people have varied from violence to cooperation. At the end of the 5th millennium BC and during the first half of the 4th millennium BC, contact between the North Black Sea area and the Balkan Peninsula was sporadic. During this period, zoomorphic stone scepters and pottery made of clay mixed with clam shells appeared in the latter region. These finds have Eurasian steppes origin and are an indication of connection – peaceful or aggressive – between local farming communities in the Balkans and stockbreeding groups coming from the North Black Sea area (Slavchev 2003; Ivanova 2003, 157; Georgieva 2005, 144–146, 155; Heyd 2011, 545; Georgieva 2018, 99–102; Preda-Bălănică – Frînculeasa – Heyd 2020, 91; Preda-Bălănică 2021, 144–145). According to P. Georgieva (2005, 155), nomadic groups slowly moved in the southwest direction and infiltrated local communities.

Later, around 3100 BC, larger groups of migrants from the Yamnaya culture (also known as the Pit Grave culture or the Ochre Grave culture) appeared in the Balkan Peninsula. These people were also nomads who originally lived in the North Black Sea area. Many scholars believe that climatic changes in the 4th millennium BC, a further dry-out of the steppes, have forced people and their livestock to travel further to the west, to the Hungarian plain (Panayotov 1989, 55; Nikolov 2006, 145; Heyd 2011, 549; Frînculeasa – Preda – Heyd 2015, 84; Kaiser – Winger 2015, 129 –130; Preda-Bălănică 2021, 147).

The Yamnaya culture is known only from its burial traditions. Typical is inhumation, either as primary individual graves under burial mounds or as secondary single graves dug in already existing mounds. In general, the grave pits are rectangular (rarely oval) in shape, dug into the virgin soil or into a mound, and sometimes accompanied by internal steps leading to the proper burial chambers. The bottom of the pit is often covered with organic mats or tree barks. The deceased, usually an adult male, is buried on the back, in supine position, with legs bent in the knees. The main orientation of both the pit and the dead is in east-west direction, with the head usually to the west. The dead person is sprinkled profusely with red ochre, usually locating in the head, feet and wrists regions of the body. Ceramic vessels, ochre pieces, bronze or copper tools, and weapons are sometimes included as grave gifts. Spiral hair rings, interpreted as hair decorations made from copper, gold or silver wire, are found near the skulls in some of the graves, while the grave pits themselves were covered with timber beams. Another relatively common element of grave assemblages is animal bones and teeth as part of the meat offering either to the dead person, and therefore found in or next to the grave pit, or as a part of the meals consumed around the ceremonies of the burial. A round earthen mound was erected over the grave. In cases when the graves are dug in already existing mounds, they are often accompanied with further mound heightening (Panayotov 1989, 45–47; Heyd 2011, 539–541; Leshtakov 2011, 565; Alexandrov 2015, 37–39; Agre 2015, 149; Frînculeasa – Preda – Heyd 2015, 47, 83; Preda 2015, 9, 34; Alexandrov – Kaiser 2016, 359–360; Iliev 2011, 391–396; Kaiser – Winger 2015, 117; Heyd 2019, 125; Valchev – Blazheska 2019, 242; Preda-Bălănică – Frînculeasa – Heyd 2020, 87, 97; Preda-Bălănică 2021, 152–155; Włodarczak 2021, 11).

Typical burial mounds of the Yamnaya culture were erected in northern Bulgaria for at least 500 years (starting in the last centuries of the 4th millennium BC and continuing during the first half of the 3rd millennium BC). It seems that the characteristic features of these burials did not change during this time span, which indicates that not just a single migration was involved. It must have been that several waves of population groups left the North Black Sea region and moved in a western direction. According to V. Heyd (2011; 2019), the Yamnaya population neither conquered their way from the Danube and Prut into the Carpathian Basin and Balkan Peninsula nor was their arrival a traumatic event. The incoming people did not enter a completely empty, unpopulated space in the regions west of the Black Sea. The farming societies in this area have been accustomed to dealing and interacting with different people and ethnic strangers for a long time (Panayotov 1989, 49; Ivanova 2003, 157; Iliev 2011, 396; Alexandrov 2015, 43; Kaiser – Winger 2015, 127, 130–132; Alexandrov – Kaiser 2016, 363, 367–368; Alexandrov 2018, 90–91; Preda-Bălănică – Frînculeasa – Heyd 2020, 97; Preda-Bălănică 2021, 156–157; Włodarczak 2021, 11).

Yamnaya culture in the valley of the Tundzha River

At the end of the 4th millennium BC, communities of the Yamnaya culture crossed the Stara planina Mountain and reached the valley of the Tundzha River. The Tundzha River passes through southeast Bulgaria. It is one of the largest rivers in the Upper Thracian plain, with a total length of 350 km and a 7884 sq. km watershed. The terrain in the river is level to hilly. The upper and middle courses of the Tundzha River pass between the Stara planina and Sredna gora mountains. It has a direct connection with the mountain passages. The Tundzha River is a left tributary of the Maritsa River. The last reaches the northern coast of the Aegean Sea (Varbanov 2002, 184).

The climate in the area is transitional between Mediterranean and Continental. Currently, it is characterised by relatively warm winters, mild humidity, and hot summers. The maximum rainfall is observed twice a year in July and November, with the minimum rainfall occurring in both August and February (Velev 2002, 156). The Tundzha River valley is dominated by smolnitsas and alluvial-meadow soils. The presence of clay watertight layers under hummus allows the soil to maintain a high level of water retention. The capacity of these soils to absorb and retain nutrients, together with their low density and glutinosity, determine their fertility (Ninov 2002, 304).

During the Bronze Age, the Tundzha River valley represented a peculiar passage that connects the Aegean coast with the lands north of the Stara planina Mountain and the Danube River Basin. The Balkan Peninsula is a natural crossroads of cultural influences from the Mediterranean Sea, Central Europe and South Russian steppes. The hilly landscape in the valley of the Tundzha River offered optimal natural conditions for the newcomers – Yamnaya people. They came into contact with the local population – the communities of Ezero culture[2] (Panayotov 1989, 50–51; Iliev 2011, 395–396; Heyd 2011, 542; Kaiser – Winger 2015, 136). Archaeological excavations in the valley of the Tundzha River show a relatively peaceful contact between the two groups. One must always keep in mind that the relationships between "local" and "foreign" people are complicated and varied from violence to cooperation. They are not always peaceful, but they are always two-way – each group adopts innovations from its neighbours and develops them according to its own style.

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[2] Leshtakov (2011) rejects the existence of the Yamnaya culture in Thrace. During the Early Bronze Age, flat extramural burials with inhumations, intramural burials with inhumations, barrows with inhumations, cremation and bi-ritual burials – traditions that continued in the Late Bronze Age – all existed in the Upper Thracian plain. Thus, according to Leshtakov (2011, 561, 563, 568–569), the different cultures of the 3rd millennium BC cannot be separated according their funerary traditions.

Prestige in Bronze Age society

In Prehistory, the development of social complexity led to the separation of different social groups and the appearance of the first leaders – chiefs, priests, and warriors. In this period, personal skills were very important and supported accumulation of authority and prestige. Prestige is also marked by the purchase and use of special objects (such as weapons and personal adornments). Special objects had the following characteristics: they were made from rare, non-local, or valued raw material; had a faraway origin; were made by skilled craftsmen; and had a unique form. The accumulation of special objects displayed wealth, success, and power in a prehistoric society (Nikolov 2006, 79–80, 139–142; Băjenaru 2010, 151; Hansen 2013, 138, 159; Harding 2015, 113–114; Preda 2015, 12, 35). During the Bronze Age, new ways to present prestige appeared and developed. These innovations originally came from the North Black Sea areas, and during the migration of people, especially the communities of the Yamnaya culture, spread across vast areas in Europe.

The first innovation is the tradition of erecting burial mounds (*Fig. 1*). Burial mounds (also called tumuli, barrows, or kurgans) are conical earthen constructions that range from 0.5 m to 10 m in height and up to 60 m diameter. These impressive monuments represent a new and different way of treating the dead. They were monuments for remembering and worshiping venerated relatives and ancestors. Once constructed they become *lieux de mémoire*. The time and efforts put into the erection of burial mounds represented the prestige and privileges of the buried persons during their lifetimes (Harding 2011, 22, 26, 28; Heyd 2011, 540, 546; Bourgeois 2013, 5–7, 11–12, 200; Hansen 2013, 159; Alexandrov 2015, 43–44; Frînculeasa – Preda – Heyd 2015, 47, 85; Kaiser – Winger 2015, 132; Preda 2015,

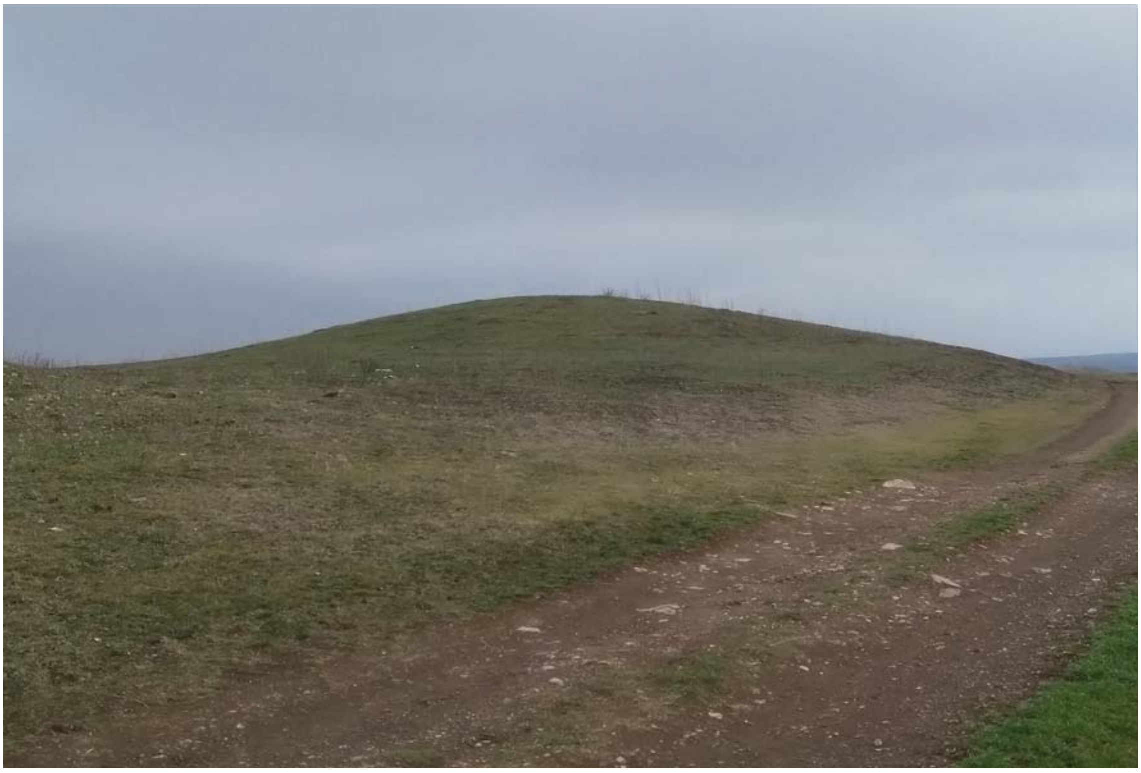

Fig. 1. An Early Bronze Age burial mound near Mogila village

8–9; Alexandrov – Kaiser 2016, 359; Heyd 2019, 125; Preda-Bălănică – Frînculeasa – Heyd 2020, 87; Preda-Bălănică 2021, 151).

In fact, one of the earliest graves under a burial mound in the Upper Thracian plain was found during the archaeological excavation of *Gonova mogila* near Targovishte, Stara Zagora district. In grave 1, the dead person was buried on the back in supine position with flexed legs. The grave had a southeast-northwest orientation, and the body of the deceased was covered with red ochre. The grave inventory included a 17.4 cm long obsidian blade and large numbers of copper and shell beads. Grave 1 is dated to the end of Bodrogkeresztúr culture in eastern Hungary and indicates steppe connections (Panayotov 1989, 49; Kanchev 1991, 45–46, 56–57; Heyd 2011, 543; Kaiser – Winger 2015, 130; Alexandrov – Kaiser 2016, 366; Preda-Bălănică 2021, 144). However, it is only during the first half of the 3rd millennium BC that a real wave of burial mounds construction could be observed in the valley of the Tundzha River. They are located, with only few exceptions, in the hilly regions east of Sazlijka River up to the Black Sea coast (Heyd 2011, 546; Alexandrov 2015, 38; Kaiser – Winger 2015, 132; Alexandrov – Kaiser 2016, 362, 365). In the valley of the Tundzha River, this mortuary tradition continued until the beginning of 4th century AD, when Christianity became the main religion in the Roman Empire, and the erection of burial mounds began to be considered a pagan tradition[3] (Bakardzhiev – Valchev – Iliev 2018).

The second innovation is spiral hair rings. The spiral hair rings were made of copper, silver, and gold, and they could have from one up to three coils. Both children and adults wore these decorations in the most visible area of the human body, the face (*Fig. 2*)[4]. Silver spiral hair rings with one, one and a half, or two coils relate to jewellery traditions in the North Black Sea areas. The native form of the silver is rare in nature, which makes it even more precious to prehistoric people. Knowledge of silver processing

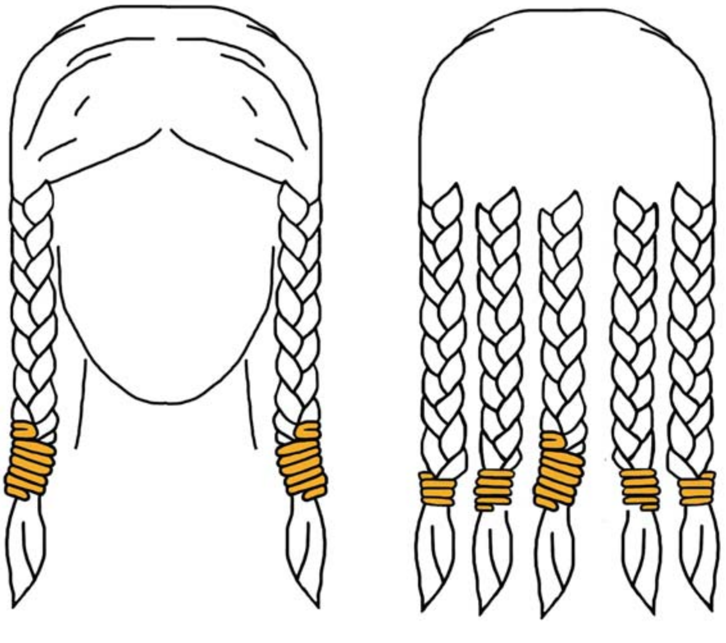

Fig. 2. A reconstruction of a hairstyle decorated with spiral hair rings (after Vasileva 2021, Table IV:16)

is uncommon in the Balkan Peninsula. Accordingly, this jewellery technology probably comes in this area from the North Caucasus, where deposits of different metals exist. In addition to their aesthetic beauty, these decorations also presented social differentiation and represented the position of their owner in the community – inherited or acquired. This was perhaps the reason that personal possessions, such as hair rings, were used to dress the dead (Panayotov 1989, 36, 47; Ivanova 2003, 162–163; Heyd 2011, 540; Frînculeasa – Preda – Heyd 2015, 71; Kaiser – Winger 2015, 136; Preda 2015, 18–19, 22; Vasileva 2016, 227–228; Alexandrov 2017, 219, 224; Vasileva – Minkov 2018, 99; Valchev – Blazheska 2019, 242; Preda-Bălănică – Frînculeasa – Heyd 2020, 97; Vasileva 2021, 218–219).

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[3] There are more than 1200 burial mounds in the Yambol district. To date, 88 burial mounds have been excavated, and only 11 of them date to the Early Bronze Age (Valchev 2018; Valchev – Sobotkova 2019).

[4] Various positions of spiral hair rings are shown in *Worn to Impress. Development and Significance of the Metal Spiral Hair Ornaments in Early Bronze Age – Upper Thrace* by Z. Vasileva (Vasileva 2021, T. IV.16).

From the valley of the Tundzha River, 30 silver spiral hair rings are known (*Figs. 3* and *4*). One spiral hair ring with one coil, and another one with one and a half coils, were found in grave 13 from burial mound 1[5], locating near Boyanovo village, Yambol district (Iliev 2011, 384; Valchev – Blazheska 2019, 240, Fig. 2: 14, 15; Iliev – Bakărdžiev 2020, Taf. 51/2-3; Vasileva 2021, 223). In addition, one spiral hair ring with one and a half coils was found in grave 14, two spiral hair rings with one and a half coils were found in grave 16, and two spiral hair rings with one and a half coils were found in grave 18 excavated from the burial mound *Lozyanskata mogila* near Boyanovo village, Yambol district (Iliev 2011, 386–388; Agre 2015, 161–169, Fig. 31, Fig. 32, Fig. 34, Fig. 35, Fig. 39; Valchev – Blazheska 2019, 239; Vasileva 2021, 221–222, T. II.6). Further six spiral hair rings with one coil were found in grave 5 (also known as inhumation grave 3) excavated from a burial mound near Drazhevo village, Yambol district (Valchev – Blazheska 2019, 238, Fig. 2: 6–11; Iliev – Bakărdžiev 2020, Taf. 27/1–6, Taf. 28/1–6), while two spiral hair rings with one and a half coils were found in grave 30 from the burial mound *Gabrova mogila* near Kamen village, Sliven district (Dimitrova 2014, 69–71; Valchev – Blazheska 2019, 241; Dimitrova 2021, 199; Vasileva 2021, 220, T. IV.9). Four spiral hair rings with one and a half coils were found in grave 5, two spiral hair rings with one and a half coils were found in grave 7, and one spiral hair ring with one and a half coils was found in grave 9, all of them from the burial mound *Shekerdzha mogila* near Kamen village, Sliven district (Dimitrova 2014, 76–78; Valchev – Blazheska 2019, 241; Vasileva 2021, 220–221). Moreover, two spiral hair rings with one and a half coils were found in grave 17 excavated from the burial mound near Malomirovo village, Yambol district (Alexandrov *et al.* 2022a), and three spiral hair rings with one and a half coils were found in grave 29 from the burial mound in *Golemia Kajryak* near Mogila village, Yambol district (Valchev – Blazheska 2019, 237, Fig. 2: 1, 2, 4; Iliev – Bakărdžiev 2020, Taf. 9/2–4; Vasileva 2021, 221, T. II.1).[6] Furthermore, two spiral hair rings with one and a half coils were found in grave 14 from the burial mound in *Malkia Kajryak* near Mogila village (Alexandrov *et al.* 2022b)[7], while two spiral hair rings with one and a half coils were found in grave 1 from the burial mound near Straldzha town, Yambol district (Alexandrov 2017, 215, Fig. I/2–3, Fig. VI/1, 2; Valchev – Blazheska 2019, 242; Vasileva 2021, 221, T. II.2). Finally, one spiral hair ring with one and a half coils was found in grave 4 and one spiral hair ring with two coils in grave 5 from the burial mound near Zimnitsa village, Yambol district (Iliev 2011, 390; Valchev – Blazheska 2019, 240, Fig. 2: 12, 13).

In the middle of the 3rd millennium BC, rich gold deposits in the southeastern part of the Balkan Peninsula were rediscovered and once again attracted the attention of the local smiths (Dimitrov – Stoychev 2018, 48–49). Precious metals have a special place in human history and the scale of values in European prehistory. It is a symbol of the life-dispensing sun, light, purity, fertility, and success. In

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[5] The burial mound is known under this name in the Bulgarian literature.

[6] In this grave a hair ring of the Zimnicea type was also found (Valchev – Blazheska 2019, 237, Fig. 2: 3*;* Iliev – Bakărdžiev 2020, Taf. 9/1; Vasileva 2021, 221).

[7] Two hair rings of the Zimnicea type and one silver plate-decoration were also found from this grave (Alexandrov *et al.* 2022b).

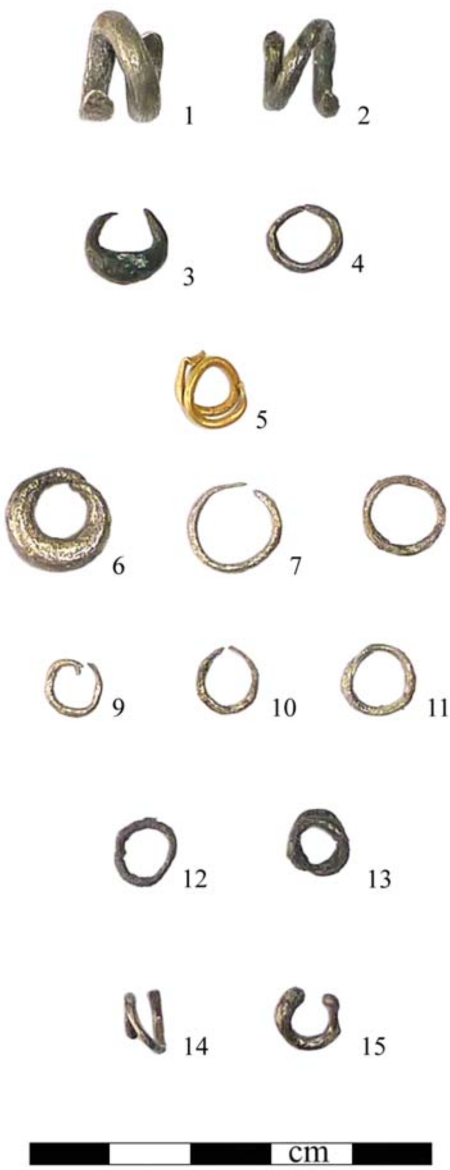

Fig. 3. Silver and gold spiral hair rings from the valley of Tundzha River (after Valchev – Blazheska 2019, Fig. 2)

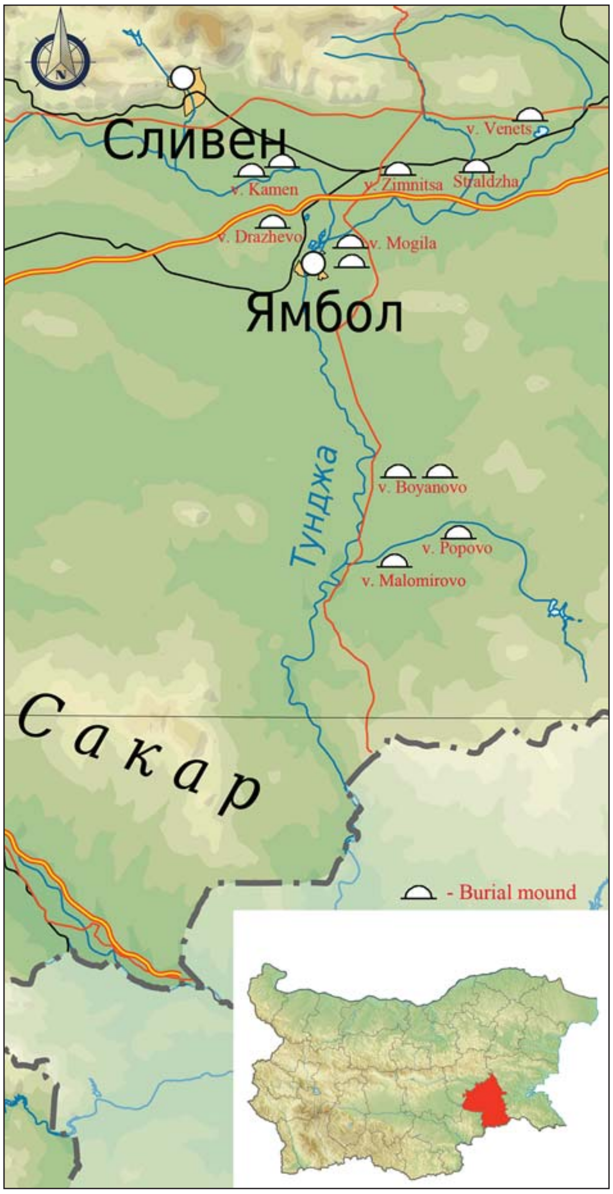

Fig. 4. Map of burial mounds with hair rings

addition, its ability to resist corrosion makes it "divine metal" (Pernicka 2018, 215; Armbruster 2013, 454, 461; Harding 2015, 114).

During this time, the first gold spiral hair rings appeared in the valley of the Tundzha River. A spiral hair ring with two coils was found in grave 30 from a burial mound near Popovo village, Yambol district (Valchev – Blazheska 2019, 238, Fig. 2: 5), while two spiral hair rings with one and a half and three coils were found in grave 3 excavated from a burial mound near Venets village, Burgas district (Georgieva – Nikov – Hristova 2018, 329, Fig. 2; Valchev – Blazheska 2019, 238; Vasileva 2021, 223, T. IV.10–11). In addition, two spiral hair rings with two and a half and three coils were thrown out by treasure-hunters from the burial mound near Malomirovo village, Yambol district (Vasileva 2021, 221, T. IV.12). Finally, one spiral hair-ring with one and a half coils was found in grave 4 from the burial mound *Shekerdzha mogila* near Kamen village, Sliven district (Dimitrova 2014, 79–80, Fig. 10: 2). The golden spiral hair rings show the local development of this jewellery in the valley of the Tundzha River.

The last innovation is the dagger. A dagger is a weapon that is sharpened at both sides and has a maximum length of 30 cm. The knife (any object with one sharp edge) is well known in the Balkan Peninsula, but the dagger is an innovation. With sharpened edges, it can inflict severe cuts and slashes. It is a weapon for hand-to-hand fight and harms other people.

Some of the earliest flat tanged daggers in the valley of the Tundzha River were found during the archaeological excavation of the burial mound *Gabrova mogila* near Kamen village, Sliven district. One dagger was found near the cremated human bones in grave 28.[8] It had a leaf-like form with a trapezoidal tang. It is 5.35 cm long and 1.95 cm wide (Dimitrova 2014, 75; Dimitrova 2021, 194). Two more daggers were found in grave 30 near skeletons 2[9] and 3[10]. They have an elongated triangular form with a trapezoidal tang. The first one is 14.2 cm long and 3.4 cm wide. The second one is 12.9 cm long and 2.9 cm wide (Dimitrova 2014, 71, Fig. 5: 2, 3; Dimitrova 2021, 198–199). During excavation of the burial mound near Drazhevo village, Yambol district, a similar dagger was found. It was put as a grave good in grave 5[11] (also known as inhumation grave 3). The dagger has an elongated leaf-like form, with a triangular tang with traces of wooden handle. It is 10 cm long and 2.4 cm wide (*Fig. 5*) (Iliev – Bakărdžiev 2020, Tafl. 27/7, Taf. 28/7).

Daggers appeared during the Bronze Age and spread across all areas of Europe and the Mediterranean Sea. According to N. Skak-Nielsen (2009, 351–352), they have been used during animal sacrifices and as a prestigious object to demonstrate the owner's high status and wealth in livestock. The analysis of 10 daggers from a site near Pragatto, Italy, showed that they have been used to process animal carcasses[12], including cutting bones, tendons, and muscles. The daggers have been repeatedly sharpened, denoting a preoccupation with keeping them sharp throughout their use life (Caricola *et al.* 2022, 2, 5).

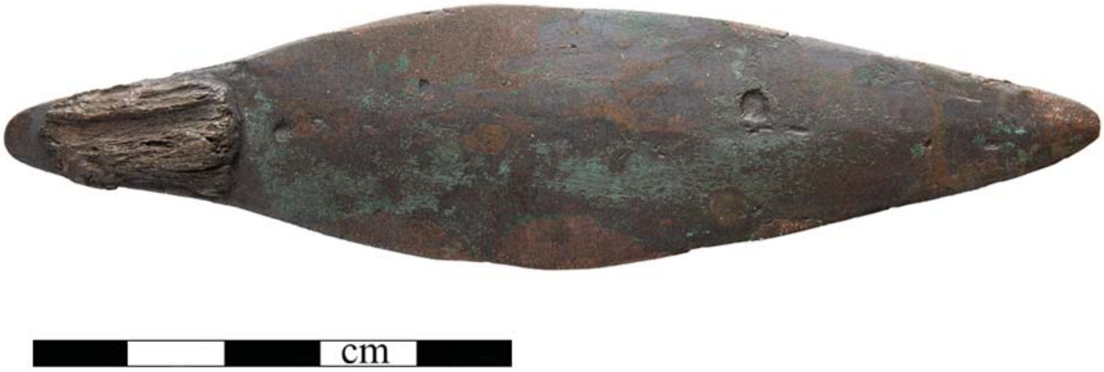

Fig. 5. Bronze dagger from grave 5 from burial mound near Drazhevo village

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[8] The grave goods included also bone amulet or pin (Dimitrova 2014, 75; Dimitrova 2021, 194).

[9] The grave goods included also a ceramic *askos* with incised decoration and amulet of boar tusk (Dimitrova 2014, 70–71; Dimitrova 2021, 198; Vasileva 2021, 220).

[10] The grave goods included also a ceramic *askos* with incised decoration, two silver spiral hair rings with one and a half coils, a bronze adze, and a wild boar tusk amulet (Dimitrova 2014, 71; Dimitrova 2021, 198–199; Vasileva 2021, 220).

[11] The grave goods included also four ceramic vessels, six silver hair rings with one coil, four silver round ornaments, two copper awls, a flint blade and a shell (Iliev – Bakărdžiev 2020, 31).

[12] In my opinion, the traces found on the daggers can be from human carcasses, too.

According to S. Hansen (2013, 151–152), daggers must have played an important role in the ideals of masculinity and heroism. In fact, during the Bronze Age, military components were considered as important, and the hunter from earliest ages transformed into a warrior, whose role was to engage in fights. Accordingly, new types of weapons for close combat like swords, rapiers, and spearheads appeared. With the development of warfare, daggers became a common type of weapon and a symbol of the warrior (Ivanova 2003, 165; Ivanova – Tsimidanov 2004; Skak-Nielsen 2009, 251; Băjenaru 2010, 151, 155–156; Heyd 2011, 546; Harding 2015, 115–116; Preda 2015, 32; Iversen 2017, 368; Caricola *et al.* 2022, 5). According to S. Ivanova and V. Tsimidanov (2004, 136–137) in the Bronze Age, and especially in communities of the Yamnaya culture, all capable men were carriers of military function, but the presence of weapons in the graves can be considered as a sign of certain military merits of the buried ones.

The daggers from the burial mounds near Drazhevo and Kamen villages have more symbolic than real functions. As personal objects, they indicate the individual's social status and acquired position in the Bronze Age society.

Conclusions

The end of the 4th millennium and the first half of the 3rd millennium BC was one of the most dynamic and interesting periods in Balkan history. This was a period of migration, of people's transfer of technological know-how, the exchange of ideas and innovations, cultural influences, and beliefs. During this time, new ways of presenting prestige, such as burial mounds, silver hair rings, and bronze daggers, were developed. These innovations reached the valley of the Tundzha River with nomadic people from the steppes, mainly the communities of Yamnaya culture, which spread from the Ural Mountains to the Hungarian Plain. The new prestige symbols were adopted and developed by the local population – probably their elite – because metal was not available for many people and not for everyone, and time and effort were put into the erection of a burial mound.

In the Early Bronze Age, personal skills were very important and supported the accumulation of authority and prestige, but the presence of children graves with silver hair rings in burial mounds indicates that an inherited social status already existed. The children were assigned the status of the social group to which they belonged by their origin and probably developed it during their active social life. The development of the military component in the Early Bronze Age society led to the formation of warriors who were engaged in fighting with other people and had a strict hierarchy. During this period, all men were carriers of military function, but few had reached the leading position for organising attacking or defensive operations and the honour to be buried with weapons.

During the Early Bronze Age, the complexity of the social hierarchy was manifested by burial rites. At least two social classes – born-free men and the elite with inherited status (priests, commanders-in-chief, or leaders/chiefs, who concentrated religious and military power) – existed. The last ones are carriers of social-prestige, which can be visible – represented by adornments and other special objects – and invisible – personal skills and authority in society. This is when the consolidation of power – economic, military, religious, and political – begins.

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From West to East and East to West: Yamnaya Migration and Interaction with Copper Age/Early Bronze Age Carpathian Communities in Transylvania

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Abstract

The spread of Yamnaya migrants from the Eurasian Steppe towards Transylvania and the Carpathian Basin has been a major focus of archaeological research. The consequences of this migration, however, would have been more nuanced than traditionally envisioned. We present novel insights into the consequences of the Yamnaya migration through new analyses of the material culture, chronology, and funerary practices in southwest Transylvania. Within Transylvania and the Carpathian Basin, the introduction of Yamnaya ideas did not result in the full abandonment of Early Bronze Age traditions or the replacement of local populations with newcomers. Instead, local communities responded and shifted some practices, while maintaining a strong connection to their Copper Age ancestry through the reuse and repurposing of space. As in any dynamic social context, Yamnaya and their descendant communities adopted and moved objects and ideas from the west to the east and the Eurasian Steppe. In light of the data presented here, we argue that Transylvania during the Late Copper Age and Early Bronze Age was a dynamic context of migration, interaction, social change, and continuity.

Key words: *Transylvania, Early Bronze Age, Coțofeni, Yamnaya, radiocarbon dates*

Yamnaya, migration, and social change

Communities from the Eurasian steppe, called "the Yamnaya culture" by archaeologists, migrated into the Carpathian Basin during the Late Copper Age and Early Bronze Age (Heyd 2011; Anthony 2021). The Yamnaya are most strongly associated with large kurgans (burial mounds/tumuli) that remain a monumental presence on the landscape even today. Research into the western expansion of Yamnaya has mainly focused on the group of mounds distributed in the Lower Danube area: Bulgaria (Kaiser – Winger 2015), southern Romania (Frînculeasa – Preda – Heyd 2015; Frînculeasa 2021), eastern Serbia (Koledin *et al.* 2020) and the Tisza region (Horváth *et al*. 2013; Dani 2020; Dani – Kulcsár 2021). However, unlike the regions of the Lower Danube or Tisza rivers, the uplands of Transylvania continued to be dominated by local Early Bronze Age (EBA) groups throughout the beginning of the 3rd millennium BC (Ciugudean 1996; 2011; Preda-Bălănică – Frînculeasa – Heyd 2020).

For multiple reasons, Yamnaya has caught the attention of many scholars of European prehistory. Recent ancient DNA (aDNA) research has demonstrated that people with ancestry in the Eurasian (Pontic-Caspian) steppe migrated west into Europe (Allentoft *et al.* 2015; Haak *et al.* 2015; Mathieson *et al.* 2018). Picking up on aDNA and linguistic analysis, Kristiansen *et al.* (2017) developed a model that credits Yamnaya expansion for precipitating social change and transformation leading to the emergence – perhaps in parallel – to other cultural identities such as Corded Ware. This work has a precedent, from the work by Gimbutas (1961) and in Anthony's (2007) argument that horse-riding, wagon-driving, and proto-Indo-European-speaking Yamnaya migrated west from the Eurasian steppe, and fundamentally transformed Europe forever (also see ANTHONY – RINGE 2015).

Many archaeologists are skeptical of narratives that centre migration as an explanation for social change – for good reason. FURHOLT (2021) notes that migration narratives often rely upon "archaeological culture" frameworks – the belief in culturally and biologically homogenous territorial groups – that were constructed in the 19th century as part of nationalistic, colonial, and racist endeavours to demonstrate superiority of certain peoples over others. Archaeological cultures were defined on the basis of a very narrow range of material signatures (e.g. Corded Ware Culture, Beaker Culture, Kurgan Culture). When material signatures changed, migration was pointed to as one of two possible explanations – along with diffusion – for why this change occurred. Implied in these models was a sense of conquest, superiority, and "survival of the fittest" concepts in social Darwinism that were dominant in intellectual circles of the late 19th century. When archaeologists began to reject these models of how societies are organised, they also threw out the preferred models of explaining social change – migration and diffusion – and replaced them with explanations for social change that are often endogamous to a society. For example, the emergence of agriculture did not have to be explained by waves of migrating farmers, but could also have emerged through independent episodes of domestication that fostered the growth and expansion of complex socioeconomic systems. After decades, explanations that centre migration are still seen in many quarters as outdated and inherently linked with concepts of racial superiority and colonialism (see FURHOLT 2021). With the advent of aDNA and the reemergence of migration as a causal mechanism in the study of social change in European prehistory, these issues have once again been brought to the forefront of archaeological discourse.

FRIEMAN and HOFMANN (2019) outline the consequences of this theoretical and methodological turn – especially on the narratives of population and cultures. Echoing BURMEISTER (2000; 2017), the authors call for archaeologists to build new theory and methods of understanding migration in the past by developing high-resolution chronologies, examining the dynamic role of material culture in how people construct identity, and to provide sophisticated explanations for how people behave in contexts of cultural interaction. Archaeologists, therefore, need to contextualise narratives of large-scale migration derived from aDNA into a social framework that acknowledges the complicated, and sometimes messy, ways that people interact with each other.

This perspective informs our approach to the Yamnaya expansion from the Eurasian steppe into the Carpathian Basin and Transylvania. As in any context of a population movement, there would be both continuities and discontinuities in social practices as locals and migrants navigated the dynamics of a new social landscape. Yamnaya communities would have been affected as they were exposed to different ideas held by the local communities into which they moved. Likewise, local communities would have adapted as well, sometimes adopting social practices brought in by immigrant communities. Adoption of social practices often includes some translation and modification – which will affect both migrant and local communities. We must also be careful not to overstate the scale of Yamnaya migration, especially in Transylvania (see GOGÂLTAN 2021; FRÎNCULEASA 2021). It is possible to have the introduction and diffusion of ideas associated with Yamnaya through an existing population without full-scale migration occurring.

As a result, looking for continuities and discontinuities across a broad range of social, economic, and ritual dimensions rather than focusing on one single line of evidence can help archaeologists better understand the nature of interaction among disparate communities. Unfortunately, as we note above, our understanding of Yamnaya in the Carpathian Basin is dominated by evidence from tumuli – and the insights they provide into mortuary rituals and archaeogenetics. In this paper, however, we examine a variety of ways in which we can see the spread of Yamnaya not only as a mechanism for social and demographic change in Europe, but that also had ripple effects back towards the Eurasian steppe.

The heritage of Old Europe: the Coțofeni culture

Prior to the arrival of Yamnaya, Transylvania was occupied by people whom archaeologists have called the Coțofeni culture; part of a broader phenomenon called the Baden-Coțofeni horizon that extended into the Carpathian Basin and beyond (Furholt – Szmyt – Zastawny 2008). We consider the Coțofeni culture as belonging to the Late Copper Age (also known as the Late Eneolithic Age) and its end marks the begining of the Early Bronze Age (EBA) in the Transylvanian region (Ciugudean 1996, 15–20, 139–148; 2021; Gogâltan 2015, fig. 23; Beck – Ciugudean – Quinn 2020). This view fits with the current Bronze Age chronology of Hungary (Kulcsár – Szeverényi 2013; Kiss *et al.* 2019), but it is still around 500 years older than the current central European chronology (Bertemes – Heyd 2002; 2015).

The relative chronology of the Baden-Coțofeni is a source of disagreement in the literature. Some Romanian and Bulgarian scholars assign the Coțofeni culture to the EBA rather than the Copper Age (Vulpe 1991; 2001; Băjenaru 2010; 2014, 25–30; Motzoi-Chicideanu 2011, 48–56; for Bulgaria see: Vajsov 2002; Alexandrov 2018). However, there are several strong cultural historical reasons for assigning the Baden-Coțofeni cultural horizon to the Late Copper Age. First, the subsistence practices (agro-pastoralism) and funerary practices (cremation under tumuli or flat cemeteries) are closely connected to their predecessors from the Middle Copper Age, such as the Funnel Beaker, Scheibenhenkel or Lažňany cultures (Sachsse 2008). Second, metallurgical traditions of the Baden-Coțofeni correspond with Late Copper or Late Eneolithic Age (Lichardus 1991; Raczky 2009; Horváth 2009; Schier 2014). The limited typology and paucity of copper objects, especially prior to the last Coțofeni phase (Vulpe 1975; Roman 1976; Ciugudean 2002), suggests a Copper Age association rather than an EBA affiliation (see Bondár 2019).

Absolute dating using radiocarbon dates and Bayesian modeling provides another way of determining the internal chronology of the Coțofeni culture and its relationship to other cultural horizons in the Carpathian Basin during the second half of the 4th millennium BC and start of the 3rd millennium BC. While archaeologists have dated Coțofeni sites in Romania for nearly three decades (Ciugudean 1996, 58–59; 2000, 145–146; 2015, 168–169; Băjenaru 1998, 6–10), the number of ^{14}C dates has remained low until recently (Diaconescu – Tincu 2016; Diaconescu 2020, 28–32; Frînculeasa 2020a, 47–50). Here we present the most complete picture of the absolute chronology of the Coțofeni culture in a broader central European context based on previously published and new samples from our work in the Apuseni Mountains and middle Mureş valley. This picture is the first one to cover the complete development of this culture, from the middle of the 4th millennium BC to the end of the first quarter of the 3rd millennium BC.

The earliest evidence of Coțofeni (phase Coțofeni I) comes from excavations in the Turdaş site,[1] where Coțofeni groups coexisted with Boleráz-Cernavoda III communities. Three samples belonging to the Coțofeni I horizon (RoAMS: 1466.117; RoAMS: 1468.117; and RoAMS: 1469.117) date to the second half of the 4th millennium cal BC (*Fig. 8*)[2]. These results correspond perfectly with the dates of the early Baden (Boleráz) (Wild *et al.* 2001; Horváth 2009, 107–108; Siklósi 2009; Bondár 2015,

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[1] The site we refer to here (Turdaş – Siteş) is not the famous Neolithic one (Turdaş – Luncă), which lies on the left bank of the Mureş river (Luca 2012), but it is located on a gentle south-eastern oriented slope of a small stream, east of the village.

[2] For the calibration, the Oxcal v 4.4.4 software (Bronk Ramsey 2021) was used. Atmospheric data from Reimer *et al.* 2020.

242–253). A bone sample (RoAMS: 1464.117) from a feature at the Turdaş site that has ceramics without early Coțofeni decoration patterns produced a calibrated date between 3706–3537 cal BC. Therefore, the proto-Boleráz occupation at Turdaş corresponds with most of the calibrated dates for this pre-Baden horizon in Hungary, Austria and Slovakia (Horváth 2009, 104–107).

The second phase of the Coțofeni culture is defined by shifts in ceramic production (Ciugudean 2000; Ciugudean *et al.* 2005, 9–18; Gogâltan – Molnar 2009), but still covers the whole area of Transylvania and Banat (Ciugudean 2000), with a clear predilection for the lowlands. There are few dates for Coțofeni II and they place it somewhere between 3300–3100 cal BC (*Fig. 8*). The date from Peţelca Unit 1 Level I (OS-113603: 4560±20 BP), together with the one from Gligoreşti – Holoame, pit 9/1994 (4514 ±30 BP, according to Frînculeasa 2020a, 48)[3], corresponds with the time of post-Boleráz/classic Baden evolution (Horváth 2009, 108–109). They both fall in the same period with part of the classical Baden graves from Budakalász (Siklósi 2009, fig. 16) and Nagykanizsa–Billa (Wild *et al.* 2001). It should be noted that the only sample collected from an animal bone (Hd-29517: 4531±21 BP) in the lowest level of Trench IV at Poiana Ampoiului falls in the same period, which might indicate that the occupation of this Coțofeni site has started earlier than previously thought (Ciugudean 2015, 168 and fig. 1).

While in the west and south, the expansion of Coțofeni groups reached eastern Serbia and north-western Bulgaria, the south-eastern corner of Transylvania seems to be somehow "abandoned" by the end of phase II, most probably before 3100 BC, according to the result of our Bayesian analysis (*Fig. 8*).

The change that took place in the evolution of the Coțofeni culture by the end of its second phase is quite spectacular, and is not restricted to the appearance of the *Fürchenstichkeramik* style. One major shift is the rapid expansion of the Coțofeni III settlements in the highlands of both western Transylvania and the Banat (Ciugudean 2000). We consider this change as likely indicative of the increase in seasonal transhumance, accompanied by additional modifications in the subsistence strategies (Becker 1999; Ciugudean 2000, 19–21; Bindea 2005).

Hăpria and Râmeţ: new perspectives on the Late Coţofeni-EBA transition

The transition from the late Coțofeni (Coțofeni III) to the EBA is a critical context in which the social consequences of the Yamnaya migration and the responses by local communities can be investigated. Two relevant and recently excavated sites, Hăpria and Râmeț (*Fig. 1* and *Fig. 2*), are highly important for understanding the shift from the Coțofeni to the EBA and the role played by the Copper Age ancestry in this complex process. These sites support existing arguments for the persistence of a strong Coțofeni ancestry in the first EBA horizon (the Livezile group) of western Transylvania (Ciugudean 1986; 1996).

The site of Hăpria, excavated in 2013[4], is located in the north-western corner of the Secaşelor Plateau, ca. 4 km from the left bank of the Mureş river (*Fig. 2*), at an altitude of 434 m above sea level. It consisted of an earthen mound/tumulus, built over a habitation area belonging to the Coțofeni culture. The mound is 16 m in diameter and about 2 m high (*Fig. 3.1*), but the latter number does not reflect the actual height of the mound, as the central area includes the debris of a demolished Coțofeni house. The majority of the soil that made up the mound consisted of redeposited cultural deposits from the Coțofeni

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[3] Regarding the relative chronology of the Coțofeni occupation, we agree with the authors that its beginning should be placed in the IInd phase and the end somewhere in the early Coțofeni III phase (Popa – Gogâltan 2014, 250–251). But we disagree that pit 9 is Coțofeni III; the ceramics found in the filling are typical for the second phase (Popa – Gogâltan 2014, pl. 16–19), a fact confirmed by the ^{14}C date.

[4] The excavations were directed by Horia Ciugudean, together with Claes Uhnér, in the frame of a cooperation project between Eurasien Abteilung of DAI, Berlin and Muzeul Naţional al Unirii, Alba Iulia.

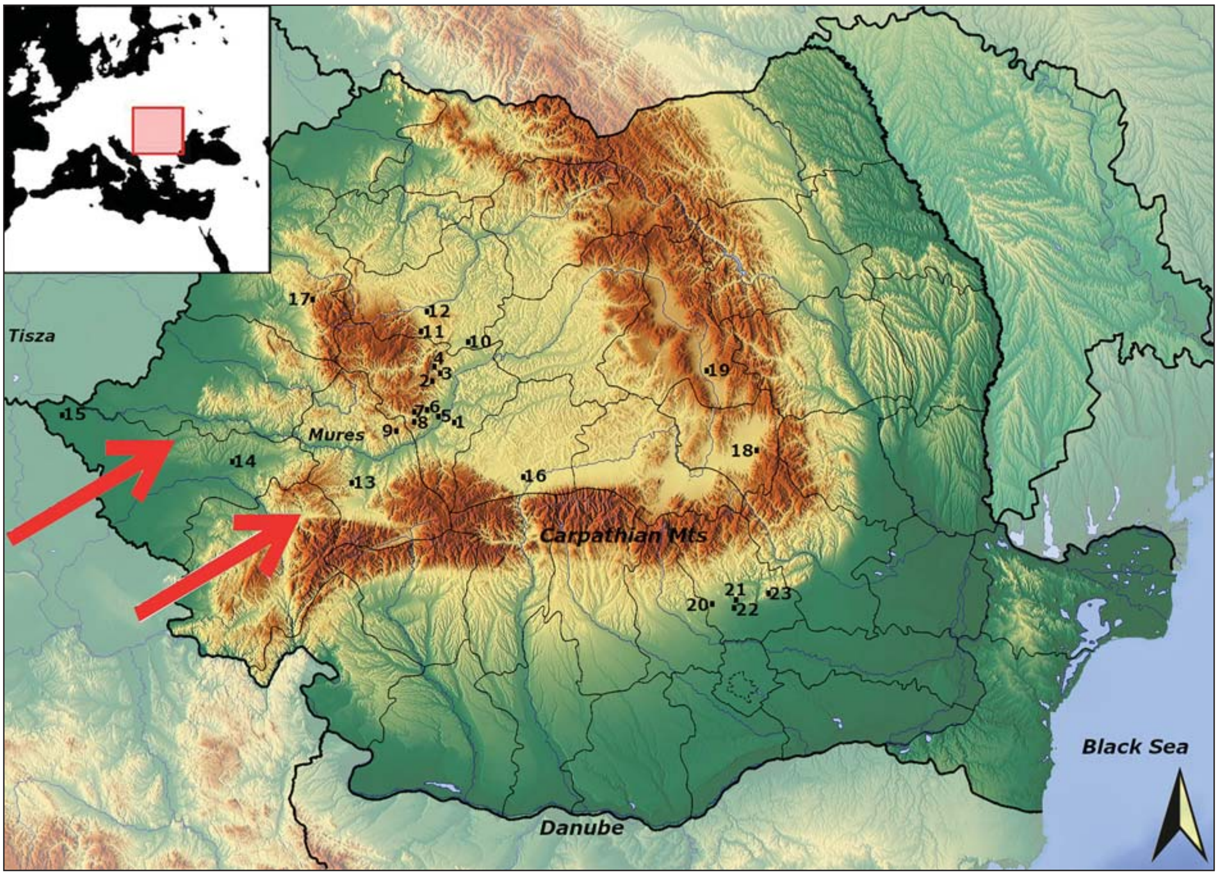

Fig. 1. Map of Romania with the location of selected EBA sites: 1. Hăpria, 2. Râmeţ, 3. Livezile, 4. Cheile Aiudului, 5. Alba Iulia, 6 Ampoiţa, 7. Meteş, 8. Poiana Ampoiului, 9. Mada, 10. Câmpia Turzii, 11. Agriş, 12. Floreşti, 13. Silvaşu de Jos, 14. Bodo, 15. Bucova Pusta, 16. Caşolţ, 17. Izbucu Topliţei,18. Zăbala, 19. Jigodin, 20. Ariceştii-Rahtivani, 21. Blejoi, 22. Ploieşti, 23. Şoimeşti, (The red arrows indicates the direction of Yamnaya expansion towards Transylvania)

habitation at the site. The fill in the central part of the mound contained stones of varying sizes, and several stones were also found in the peripheral parts. There were also a few concentrations of limestone rocks, whose origin does not seem to be related to the geological background of the surrounding area (*Fig. 3.3*). However, none of these features were associated with the burials, so how and why they arrived at the site is yet unclear. An undisturbed clay hearth was found in the central part of the mound's NE quadrant (*Fig. 3.4*), and the mound's fill also contained large amounts of ceramics (*Fig. 4*) and animal bones, as well as a few lithic and bone tools. The shapes and decoration patterns are consistent with the Coţofeni III a–b subphases, and have good parallels in the feature 5/mound 1 and feature 2/ mound 3 at Silvaşu de Jos (Luca *et al.* 2011; Diaconescu – Tincu 2016).

Two animal bones have been dated from the Coțofeni occupation level at Hăpria, calculated at 4434±26 BP/3326–2931 cal BC (95.4% probability) and 4385±24 BP/3089–2917 cal BC (95.4% probability) (*Fig. 5.1–2*). The 2 sigma calibrated dates are similar to the ones at Silvaşu de Jos (Diaconescu – Tincu 2016; Diaconescu 2020). They also correspond to the radiocarbon dates from the Prahova area south to the Carpathians, where Coţofeni III ceramics was also found in the mound IV and *Movila pe Răzoare* at Ariceştii-Rahtivani (Frînculeasa *et al*. 2014; Frînculeasa 2020a).

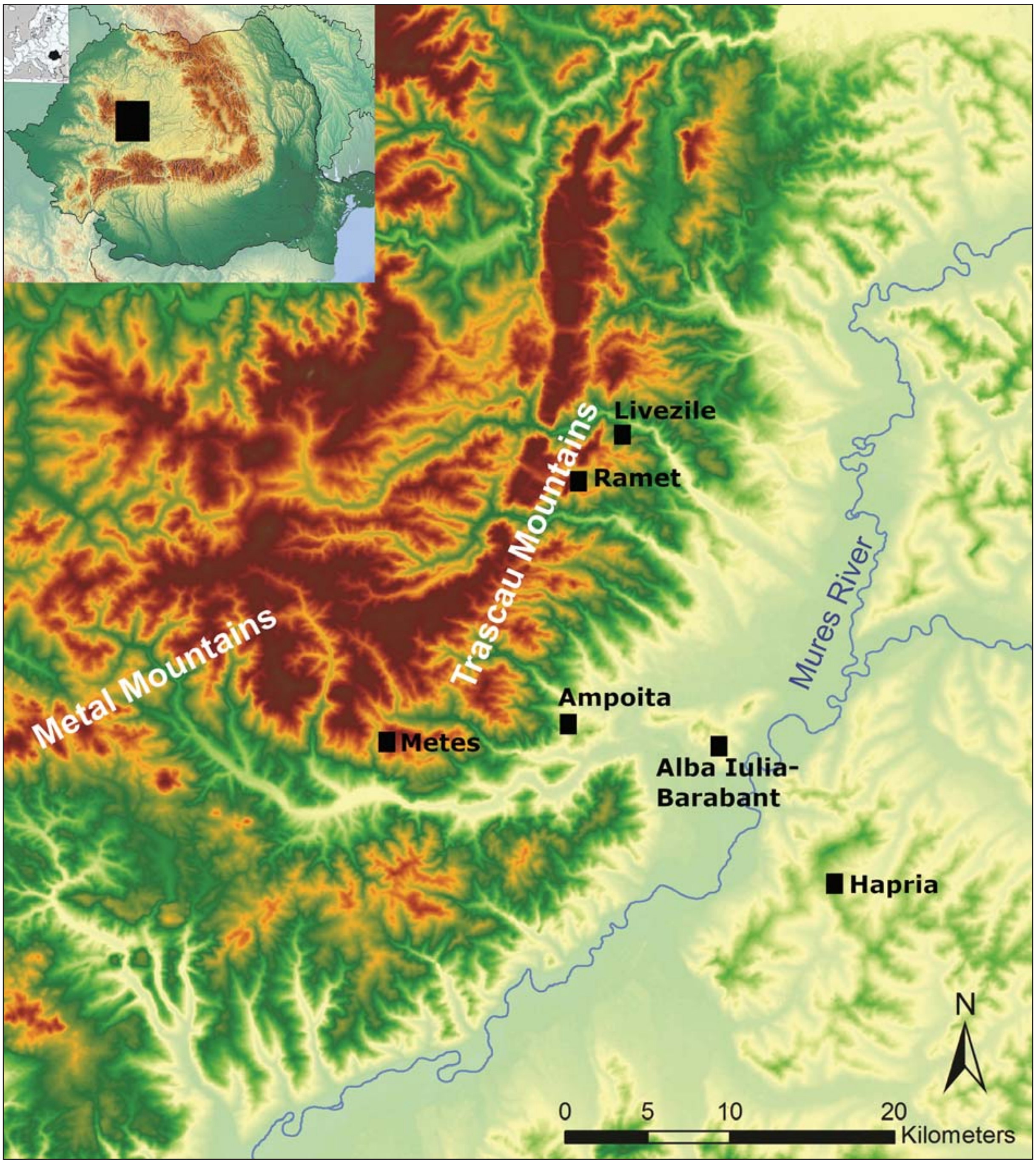

Fig. 2. EBA selected funerary sites in southwest Transylvania

Râmeț-*Gugu* is another Late Copper Coțofeni habitation site that was transformed into an Early Bronze Age cemetery. The site is located in the central area of the Trascău Mountains, part of the Apuseni Mountains (*Fig. 1.2* and *Fig. 2)*, at an altitude of 788 m (*Fig. 7.7–8).* The hilltop has a large view over the Mureş valley to the south (*Fig. 7.2*), and towards the Râmeţ Gorge to the west (*Fig. 7.1*). The Coțofeni occupation was enclosed by two ditches that were approximately 70 m in diameter *(Fig. 7.3)*. Each ditch was approximately 2 m wide and full of residential debris, the ceramics being largely included in the

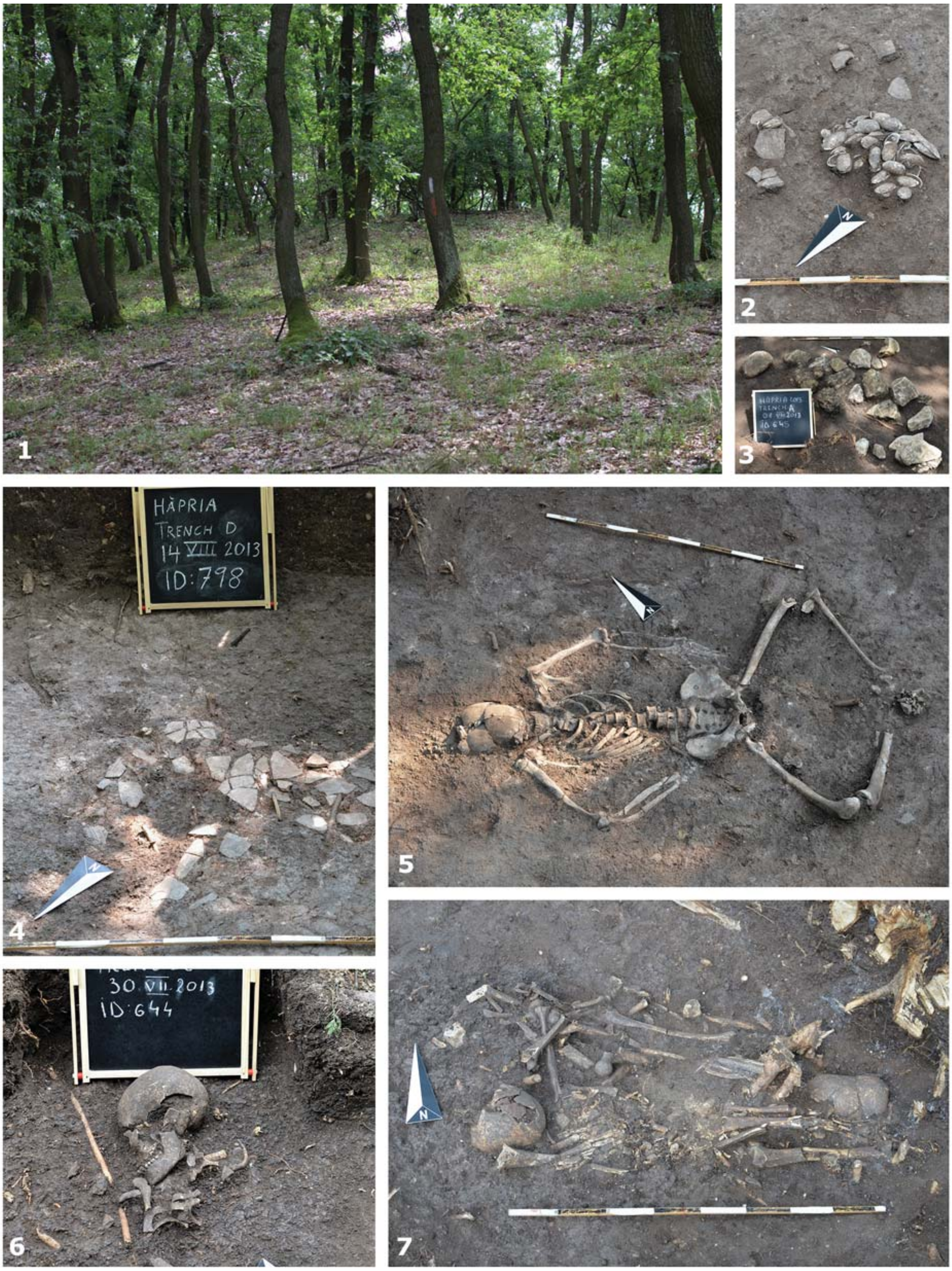

Fig. 3. The tumulus from Hăpria: 1. General view of the mound before excavation; 2. Shell deposition; 3. Limestone rocks structure; 4. Clay hearth on the Coţofeni floorhouse; 5. Primary burial with the skeleton in frog-like position (ID 984); 6. Skull deposition (ID 644); 7. Commingled burial (ID 766–789) (Photos by Claes Uhnér)

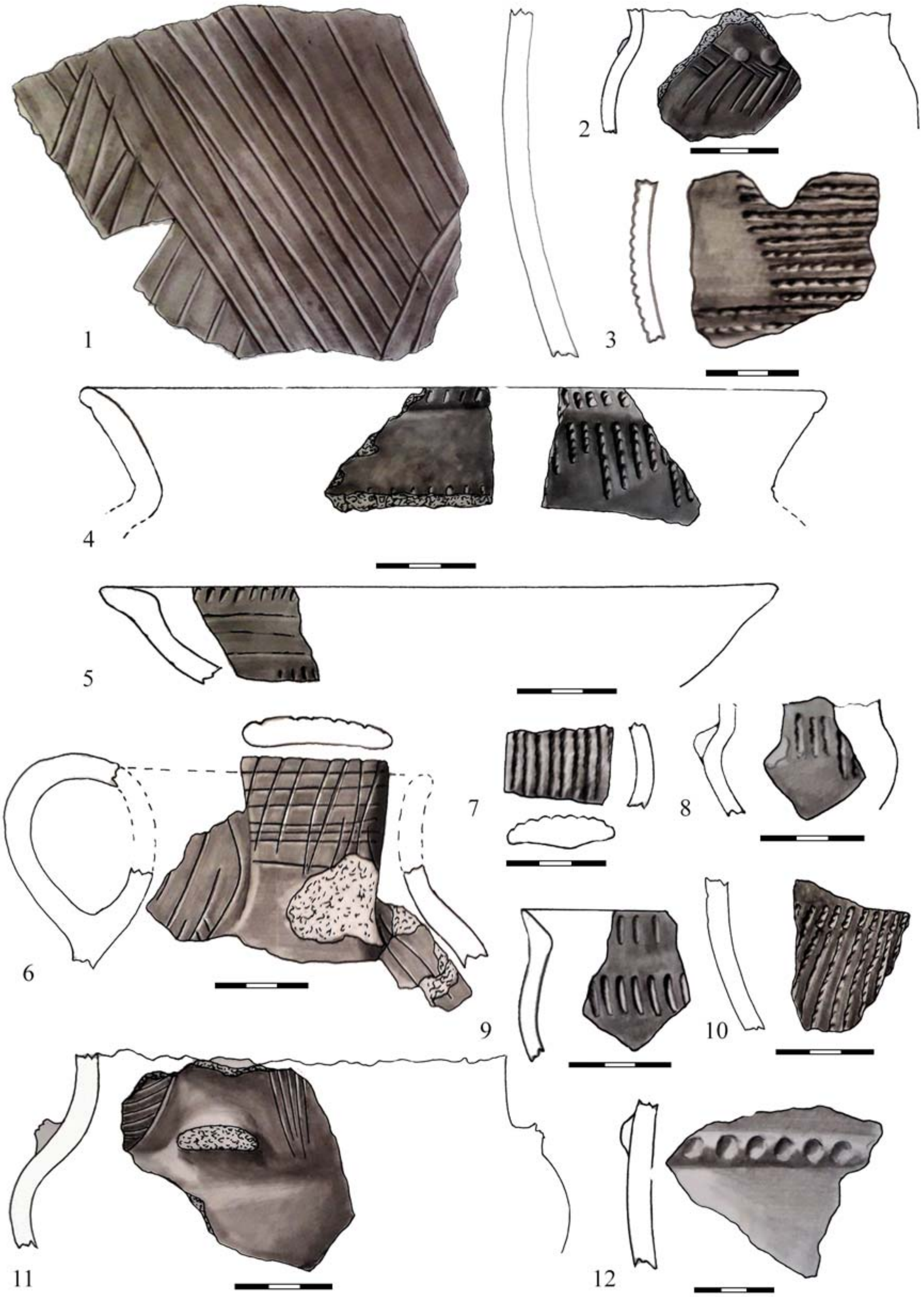

Fig. 4. Coţofeni III ceramics found in the fill of the tumulus at Hăpria

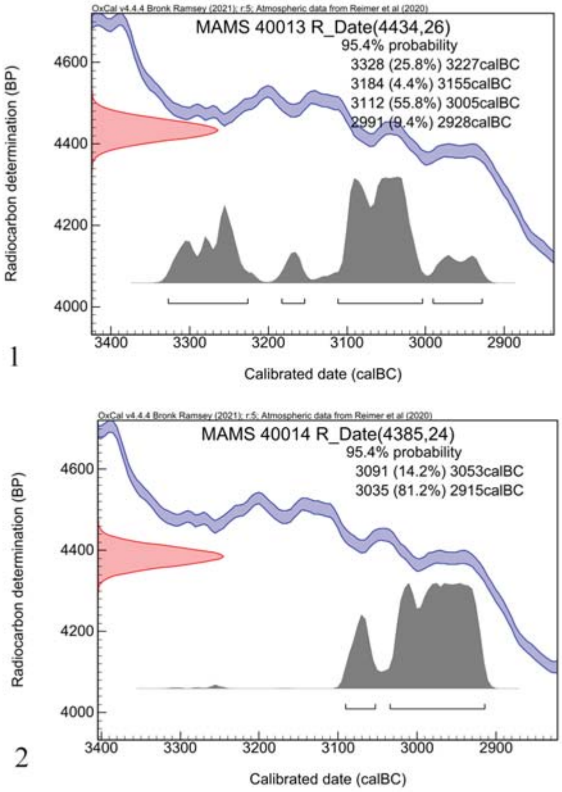

Fig. 5. Calibrated dates of animal bone samples from the Coţofeni deposition at Hăpria

Coţofeni III phase. Two samples (UGAMS-44054 and UGAMS 44056) have provided the radiocarbon dates of 4270±30 BP and 4300±25 BP respectively. Calibrated with 2 sigma, the dates fall within the time span of 2930–2790 cal BC and 2940–2880 cal BC (*Fig. 8*).

As one can easily see, the time period of the Coţofeni occupation both in Hăpria and Râmeţ overlaps from the 29th to the 31st century BC. This period coincides with the one indicated by most of the calibrated radiocarbon dates related to the Coțofeni III phase in Transylvania and outside the Carpathians (Diaconescu – Tincu 2016; Diaconescu 2020; Frînculeasa 2020a). It is true that part of the samples from the Coțofeni features under the mounds at Silvaşu de Jos have indicated slightly earlier dates (Diaconescu 2020), but it must be stressed that all these dates were from charcoal samples, which might be affected by the old-wood effect. Ongoing excavations at Râmeţ[5] have shown that an Early Bronze Age grave was built in the centre of the enclosed area, covered with a stone and earthen cairn. The periphery of the grave was encircled by a stone ring, a second small stone enclosure being found in the western periphery, its function being unclear. The main tumulus is approximately 14 m in diameter (*Fig. 7.4*) and contains several burials with the skeletons deposited in contracted positions (*Fig. 7.5*) or commingled depositions of multiple individuals (*Fig. 7.6*). There are several cremation graves from the Middle Bronze Age (Wietenberg culture), which follows a pattern of the re-use of EBA tumuli during the MBA seen elsewhere in the Apuseni Mountains, at Cheile Aiudului, Cetea and Ampoiţa-Doştior (Ciugudean 1996, 62, 133). There is evidence of intact Coțofeni deposits under a small area beneath the Râmeţ tomb. The mound fill contained redeposited Coțofeni ceramics and animal bones.

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[5] The excavations began in 2018 and are directed by Horia Ciugudean, together with Colin Quinn and Jess Beck, in the frame of a cooperation agreement between Hamilton College and Muzeul Naţional al Unirii, Alba Iulia.

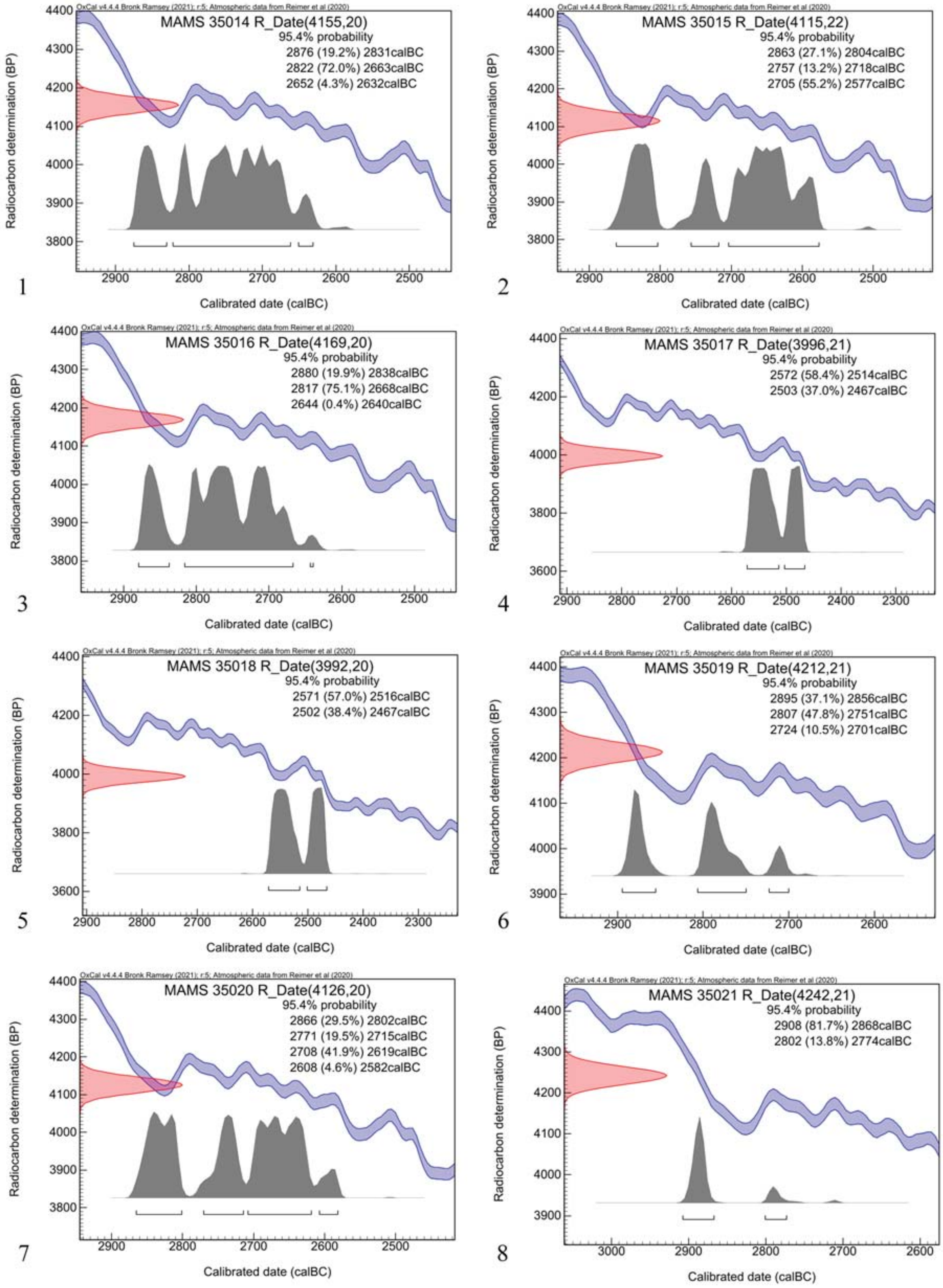

Fig. 6. Calibrated dates of the burials from the tumulus at Hăpria

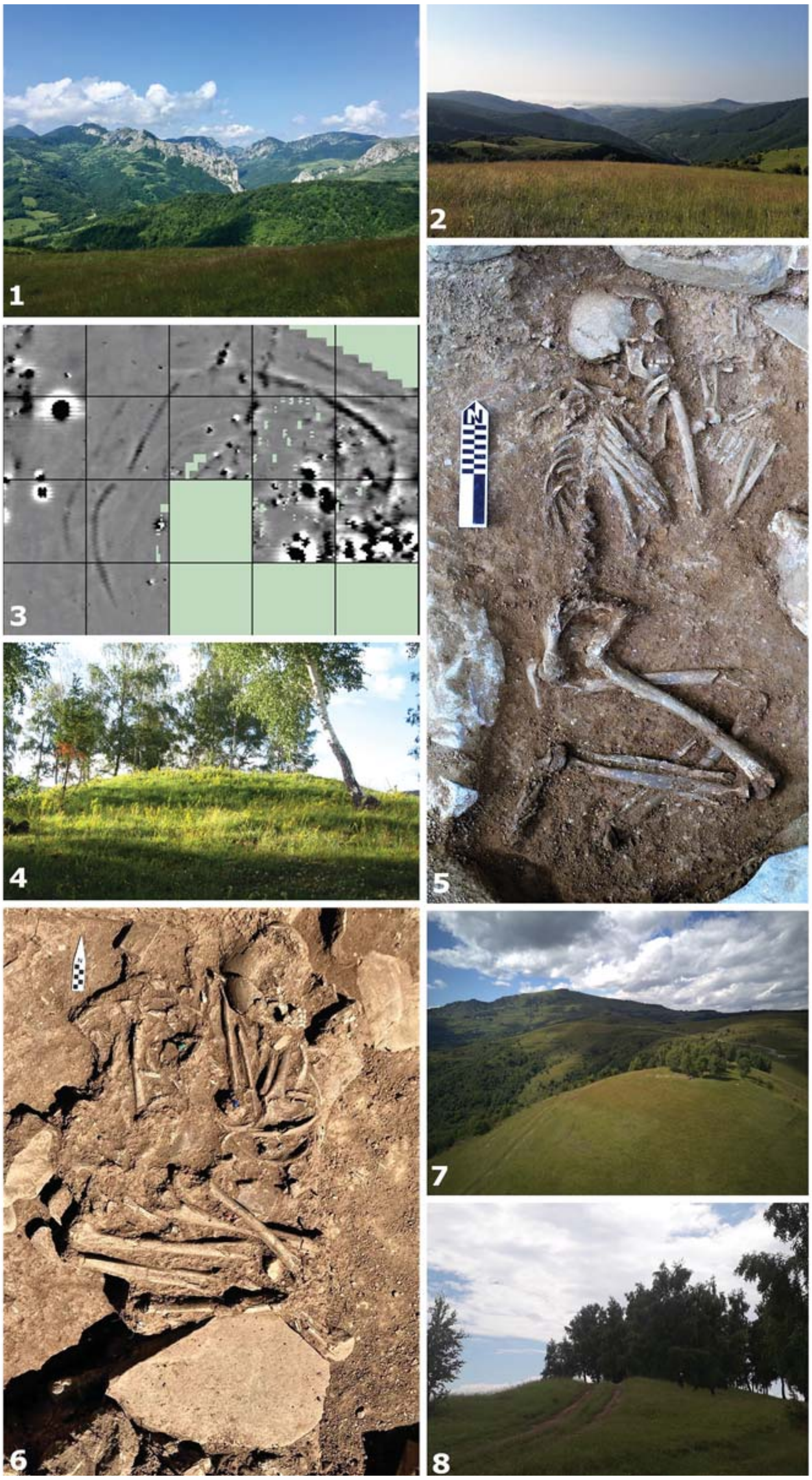

Fig. 7. The tumulus 1 from Râmeţ – Gugu: 1. View to the west with the Monastery Gorge; 2. View to the south towards the Mureş valley; 3. Magnetometer survey of the tumulus area with the two enclosures visible in the imagery; 4. View of tumulus 1 before excavation; 5. Grave with the skeleton in contracted position; 6. The primary multiple grave; 7. Aerial view of the Gugu hilltop; 8. Tumulus north to the tumulus 1 (Photos by Horia Ciugudean)

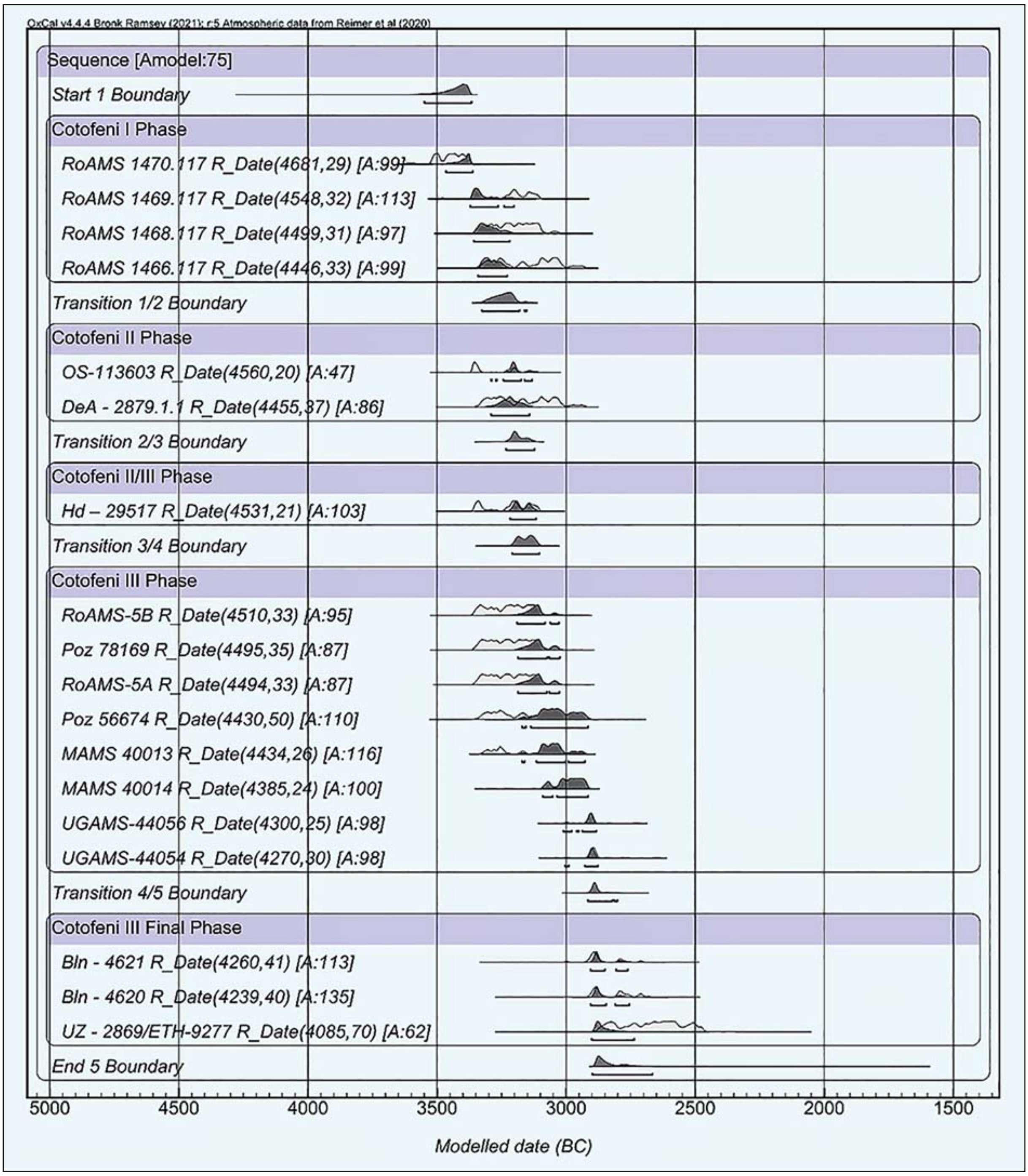

Fig. 8. The Bayesian model for the Coţofeni calibrated dates in Transylvania

At both Hăpria and Râmeţ, it is likely that there was little to no hiatus between the latest occupation and the initial grave construction. A similar idea has been recently proposed in the case of the Yamnaya kurgan built over a Kostolac site at Jabuka (Koledin *et al.* 2020). At Hăpria, the Coțofeni habitation extends to approximately 2900 cal BC and the earliest burials begin at the same time (*Fig. 9*). With excavations ongoing, it is not yet possible to determine how much time elapsed between the Coțofeni

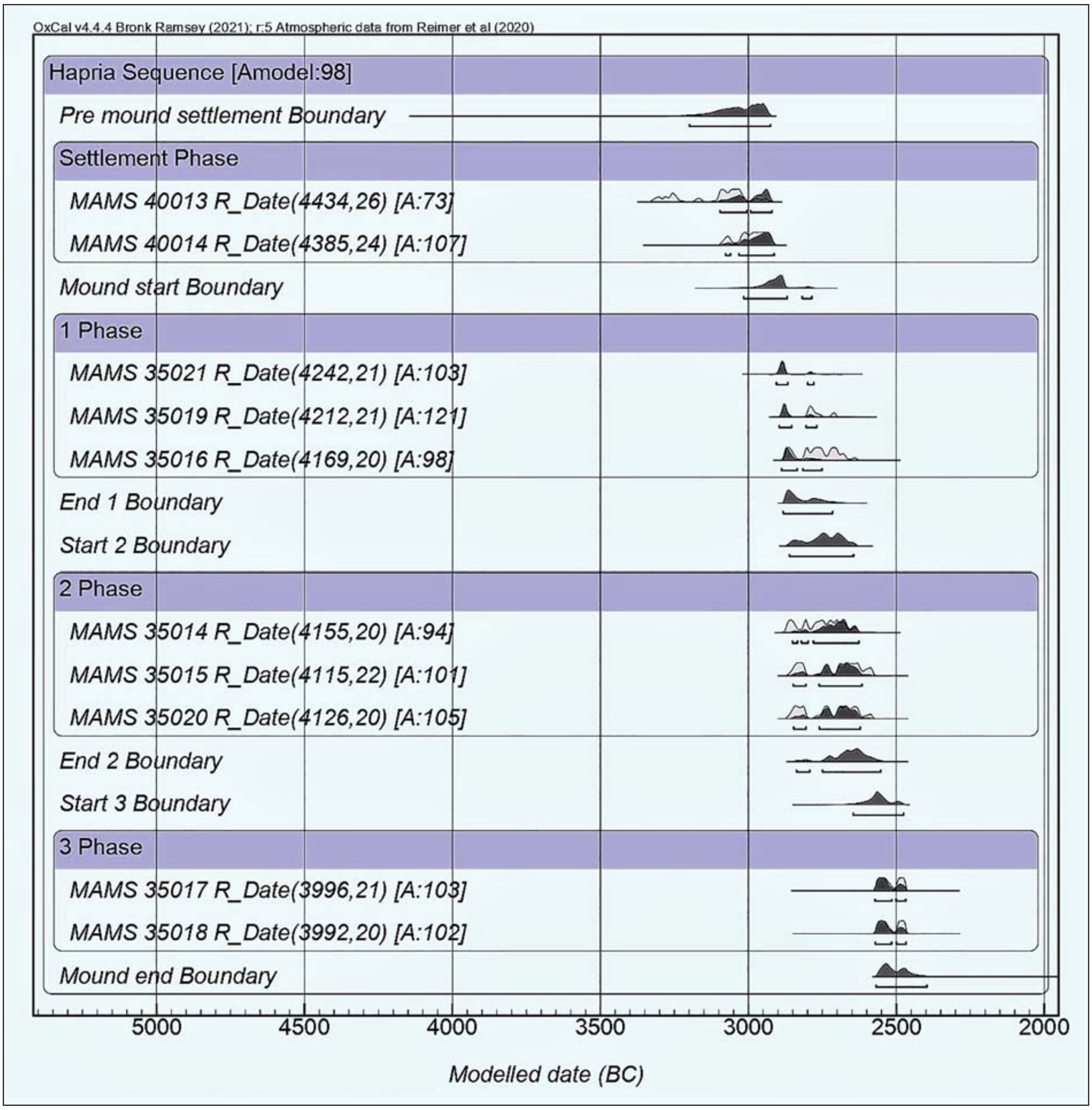

Fig. 9. The Bayesian model for the tumulus at Hăpria

occupation and mound construction at Râmeţ. A similar situation seems to be recorded south of the Carpathians in the case of the Ariceştii-Rahtivani – *Movila pe Răzoare*, where Coţofeni III ceramics was found both as grave-goods, deposited in a pit (Cpl. 1), and spread over the ancient ground (Frînculeasa 2020a). This situation can no longer be interpreted as two independent and separate chronological and cultural activities. One ^{14}C-AMS date has been sampled from the grave in Ariceștii-Rahtivani, on a human bone, calibrated with 2 sigma at 3318–2914 cal BC (Frînculeasa 2020a, Fig. 3). If all the radiocarbon dates available for the Transylvanian region are taken into consideration, then the most probable lifetime for the Coţofeni III phase would be the period between 3200/3100–2900/2800 cal BC (*Fig. 8*). This period corresponds quite well with the chronological frame recently proposed for the Coţofeni-Kostolac group in Serbia, particularly with the sequence provided by the seven samples (animal bones) from the site at Bubanj (Bulatović – Gori – Linden 2020).

The four dates from the Poiana Ampoiului site[6] have been largely debated in the most recent studies dealing with the chronology of the Coţofeni culture, and the archaeological context for two of them have been questioned due to their considerably later age (Băjenaru 1998; Diaconescu 2020; Frînculeasa 2020a). If we consider the sample UZ-2870 (4030±75 BP) as another outlier, then the three remaining dates from the Poiana Ampoiului site will fall, according to the Bayesian analysis, in the first third of the 3rd millennium BC (*Fig. 8*). They might well indicate the survival of the late Coţofeni communities in the western uplands of Transylvania, in a time when the Yamnaya expansion along the middle Mureş valley and its tributaries has already put an end to large Coţofeni hilltop settlements like Boarta, Măgura Căpudului or Şincai. A similar survival after 3000 cal BC has also been supported more recently for the late Baden horizon (Horváth – Svingor – Molnar 2008; Siklósi 2009; Krauss – Ciobotaru 2013; Kulcsár – Szeverenyi 2013). However, a longer lasting evolution of the Coţofeni III in western Romania until ca. 2650 cal BC, as it has been recently suggested (Gogâltan 2015, fig. 10) cannot be accepted, and this interpretation has been rightfully criticized (Diaconescu 2020).

Yamnaya arrival and ruptures in tradition

The beginning of the 3rd millennium BC broadly coincides with the arrival of the early Yamnaya groups in the Lower Danube (Heyd 2011; Frînculeasa – Preda – Heyd 2015; Kaiser – Winger 2015; Alexandrov 2021; Frînculeasa 2021) and the Tisza Plain (Horváth *et al.* 2013; Dani 2020).

In Transylvania, work at Câmpia Turzii (Ferenczi 1997) and other smaller excavations of earthen kurgans in the Mureş and Someş valleys date back several decades, but the presence of Yamnaya in Transylvania has only recently been acknowledged within the broader regional literature.[7] The excavation of the Silvaşu de Jos cemetery has not only confirmed the previous theoretical approach towards the Yamnaya phenomenon in Transylvania (Ciugudean 1995; 1996; 2011), but it has provided a chronological benchmark for the penetration of the Yamnaya groups from the Banat region (Diaconescu – Tincu 2016; Diaconescu 2020; Gogâltan 2021).

At both Hăpria and Râmeţ, recent excavations have provided new information about the relations between the Yamnaya newcomers and local Late Copper Age societies, as well as revealed the realignment of local practices in response to a changing social environment. In terms of location, one site (Râmeţ) is representative of the cultural landscape of the Transylvanian highlands, while the other (Hăpria) is a key locale for mapping the Yamnaya infiltration along the Mureş valley.

At Hăpria, ten burials were found in the perimeter of the tumulus, whereas the primary burial (ID 984) was located in the central area, at a depth of 0.70 cm from the surface of the mound. The interred was placed on the back along an east–west axis, with the head to the west. The knees were drawn wide apart – in the so-called 'froglike' (germ. *Froschlage*) arrangement (*Fig. 3.5*), which is a special and rare type of burial, completely unknown in the EBA graves from the Apuseni Mountains (Ciugudean 2011; Gerling – Ciugudean 2013; Beck – Ciugudean – Quinn 2020). So far, there is a single grave in Transylvania with a similar position in a kurgan near Câmpia Turzii (*Fig. 10.9*), and, according to the excavator, it was lying in the supine position on a mat, inside a pit covered with wooden beams, in

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[6] We have definitively excluded one date (UZ-2868) from our last analysis of the Poiana Ampoiului chronology, as it should be associated with the subsequent EBA occupation of the site (Ciugudean 2015).

[7] The evolution of distribution maps is highly significant, very few of them acknowledged the existence of a Yamnaya expansion in Transylvania till the last decade (e.g., Dani – Kulcsár 2021).

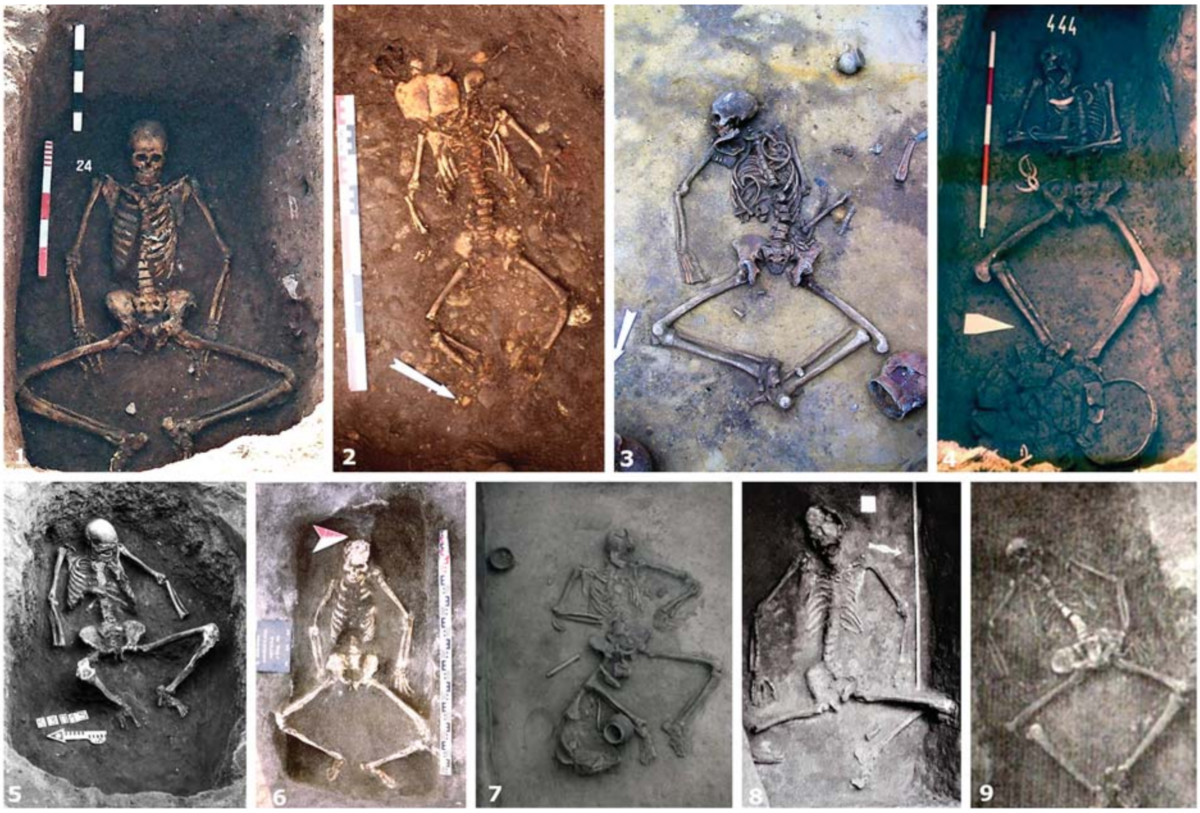


Fig. 10. Various EBA graves with the skeleton in the frog position: 1. Mogila, 2. Blejoi, 3. Rudno Gore, 4. Jelsovce, 5. Vinogradnoe, 6. Lozianska, 7. Samborzek, 8. Smeeni, 9. Câmpia Turzii (after Alexandrov – Kaiser 2016; Frînculeasa 2021; Włodarczak 2014; Bátora 2021; Rassamakin 2013; Gogâltan 2016)

which red ochre was also present (Ferenczi 1997). For a long time, this grave has been considered the best candidate for supporting a Yamnaya expansion in central Transylvania (Ciugudean 1986; 1996; 2011; Gogâltan 2016; 2021).

The recent excavation of the Silvaşu de Jos cemetery offered new evidence not only for other Yamnaya-type burials in the south-west of Transylvania, but also for the existence of an older tumular horizon with Coţofeni cremation graves, which has been dated towards the very end of the 4th millennium cal BC (Diaconescu 2020). As for the two Yamnaya burials, the dates calibrated with 2 sigma fall in the period ca. 2860–2600 BC (Diaconescu – Tincu 2016), which corresponds quite well with the timeframe of the classical Yamnaya horizon on the Lower Danube (Frînculeasa – Preda – Heyd 2015; Alexandrov – Kaiser 2016; Frînculeasa 2021).

The bone sample (MAMS 35019) taken from the skeleton deposited in the primary burial at Hăpria (*Fig. 3.*5) produced a date of 4212±21 BP which places the burial between 2895–2701 cal BC with 2 sigma calibration (*Fig. 6.6*). Another burial, which consisted of just a skull and a few vertebrae (*Fig. 3.6*) has provided a radiocarbon date of 4242±21 BP (MAMS 35021), which delivers a slightly earlier time-span with 2 sigma calibration (2908–2774 cal BC) (*Fig. 6.8*). Both of these dates fit with the ones at Silvaşu de Jos, as well as with the EBA secondary burials (Gr. 4 and Gr. 9) from Sárrétudvari-Őrhalom (Dani – Nepper 2006; Dani – Kulcsár 2021).

Sample MAMS 35018 from another burial (ID 731) provided the radiocarbon date of 3992±20 BP, which is the youngest date in the tumulus. Calibrated with 2 sigma, it is placed in the period 2571–2467 cal BC (*Fig. 6.5*). This date marks a second phase of interments in the kurgan, close to the date of the secondary burial in tumulus II at Livezile-*Baia* (Gerling – Ciugudean 2013) (*Fig. 15*). It should be noted that a contracted EBA burial in the mound with stone ring at Floreşti-Polus (Rotea *et al.* 2014) has provided a radiocarbon date of 3930±30 BP, which partly corresponds to the Hăpria calibrated date (*Fig. 16*). South of the Carpathians, four graves belonging to the Katacombnaya stage in the mound at Smeeni were dated to the same period, considered to be a phase of coexistence with the Yamnaya burials (Frinculeasa 2021). All the other graves in the Hăpria mound fall into the first half of the 3rd millennium BC (*Fig. 6*), but none of them has any grave-goods or a more elaborated funerary architecture that would connect them to the mortuary landscape of the Carpathian Basin. However, the presence of a second skeleton (ID 984), with its knees drawn wide apart – in the so-called 'froglike' arrangement – clearly differentiates the Hăpria burials from those excavated to date in the barrows of the Livezile group. It is difficult to ascertain whether the dead buried in these features had their knees pointed up, after bending their legs, or if they were originally drawn apart. Whatever the answer, the arrangement obviously differed from the pattern followed by local communities. Its uniqueness is supported by the arrangement of upper limbs, strongly departing from patterns followed in Apuseni Mountain burials (Ciugudean 1991; 2011; Motzoi-Chicideanu 2011; Beck – Ciugudean – Quinn 2020). The similar position of lower and upper limbs in the two Hăpria burials and in the case of the skeleton at Câmpia Turzii (*Fig. 10.9*), the last deposited in a rectangular pit covered with beams and powdered with ochre, relate them closely to a particular Yamnaya-type burial (Telegin – Pustovalov – Kovalyukh 2003; Heyd 2011; Rassamakin 2013; Alexandrov – Kaiser 2016; Preda-Bălănică – Frînculeasa – Heyd 2020). Y. Rassamakin called this the second burial tradition (Rassamakin 2013), while A. Frînculeasa assigned it to the first burial stage at Smeeni and dated it between 3050–2900 BC (Frînculeasa 2021). In a previous study, the burial scheme 2, which includes all the individuals lying supine with their legs flexed at the knees (*Fig. 10.1, 5–6*), is entirely placed after 3000/2900 BC (Frînculeasa – Preda – Heyd 2015). In case of the two skeletons at Hăpria with their knees drawn wide apart, both of them are clearly dated after 2900 cal BC (*Fig. 9*). The rhomboidal arrangement of legs was mirrored by the same arrangement of arms, which may indicate intentional placement. The burial at Hapria had no funerary chamber, (not even a deep pit!), and no wooden protecting planks, so the position of the lower limbs cannot be interpreted as a post-burial (fallen) position. Similar observations made in the Podolia kurgans indicate that this was a specific variant of body position, with knees distinctly spread, most likely applied to males (Włodarczak 2017). However, it should be noticed that the rhomboidal arrangement of legs it is not exclusively connected with the customs of Yamnaya communities, where most of the analogies can be found, but occasionally found in cemeteries belonging to other cultures, such as Corded Ware or Nitra (*Fig. 10.3–4, 7*).

The single variant of burial at Hăpria, which might be related to the funerary customs of Livezile group, is the commingled and disarticulated deposit (ID 766-789) of 138 bones and 46 teeth from at least five individuals, including one child, one adolescent, and three adults (*Fig. 3.7*). The skeletal remains in the deposit consist predominantly of the bones of the skull and the upper and lower limbs.

One good and securely dated parallel from the Livezile group is provided by some of the graves from tumulus 1 excavated in 1994 (Ciugudean 1996) at Meteş-*La Meteşel*. The site is an upland EBA cemetery located along a ridge between the Ampoi and Albinii valleys (*Fig. 11.1*), in the south-western region of the Trascău Mountains (*Fig. 1.7; 2*). Tumulus 1 is a large structure with a circular shape that extends approximately 15.5 m in diameter and 1.5 m in height. Its internal structure was composed of two concentric stone rings that were covered with a beaten earth mantle and housed eight different deposits of human remains – six inhumations (Gr. 2, Gr. 3, Gr. 4, Gr. 5, Gr. 6, and Gr. 7) and two cremations (Gr. 1 and Gr. 8) (*Fig. 11.5*). Bioarchaeological analysis (Beck – Ciugudean – Quinn 2020)

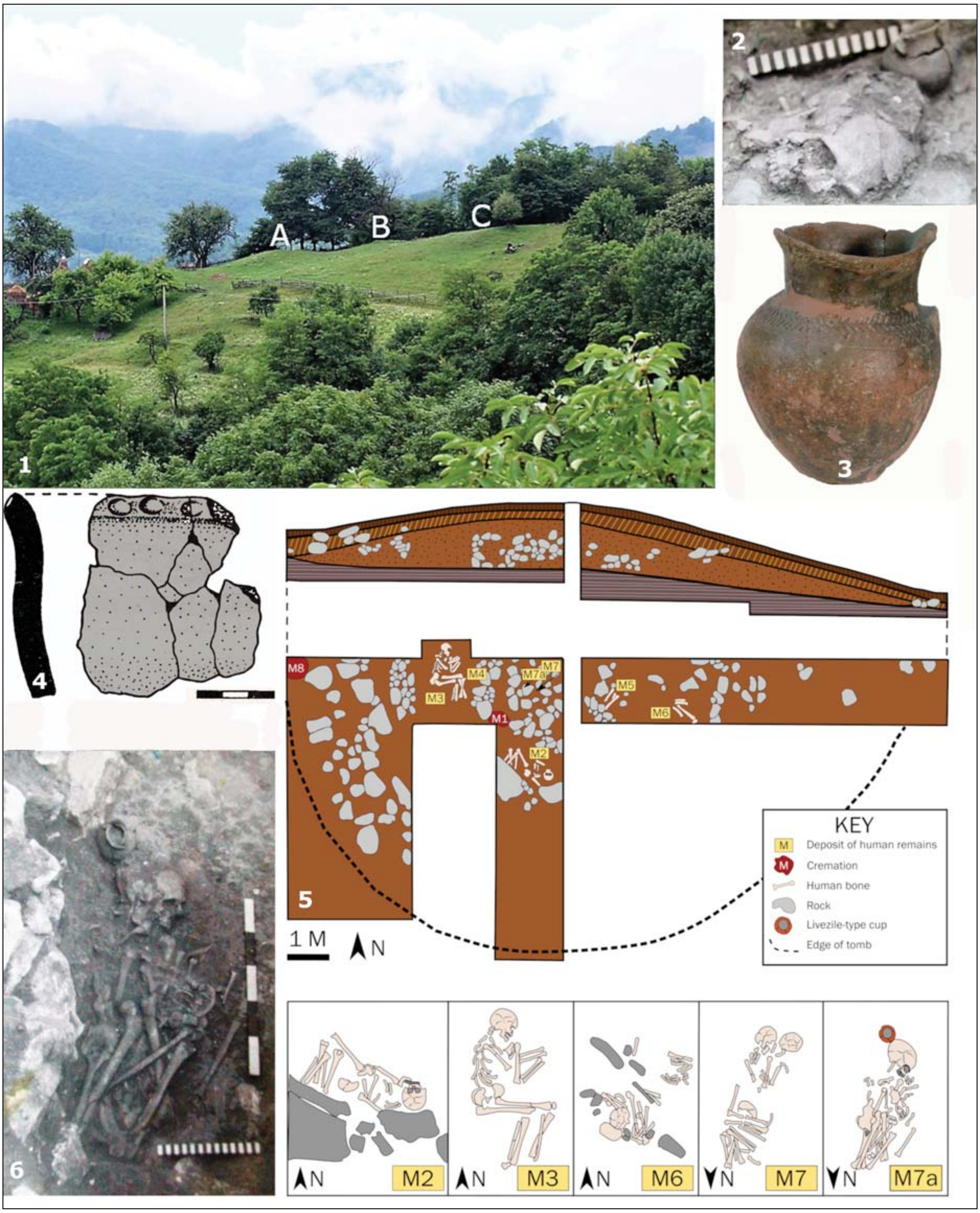


Fig. 11. The tumulus I from Meteş - La Meteşel: 1. General view of tumulus I (A) with other two mounds (B, C) along the ridge; 2. The skull of the male in grave 7-7a with the nearby cup in situ; 3. The Livezile-type cup from grave 7-7a; 4. Yamnaya-type ceramic found in the fill of the tumulus; 5. Plan of the excavated area with the position of the bone deposits; 6. View of the primary grave with the packed bones of a male (Photos and drawings by Horia Ciugudean)

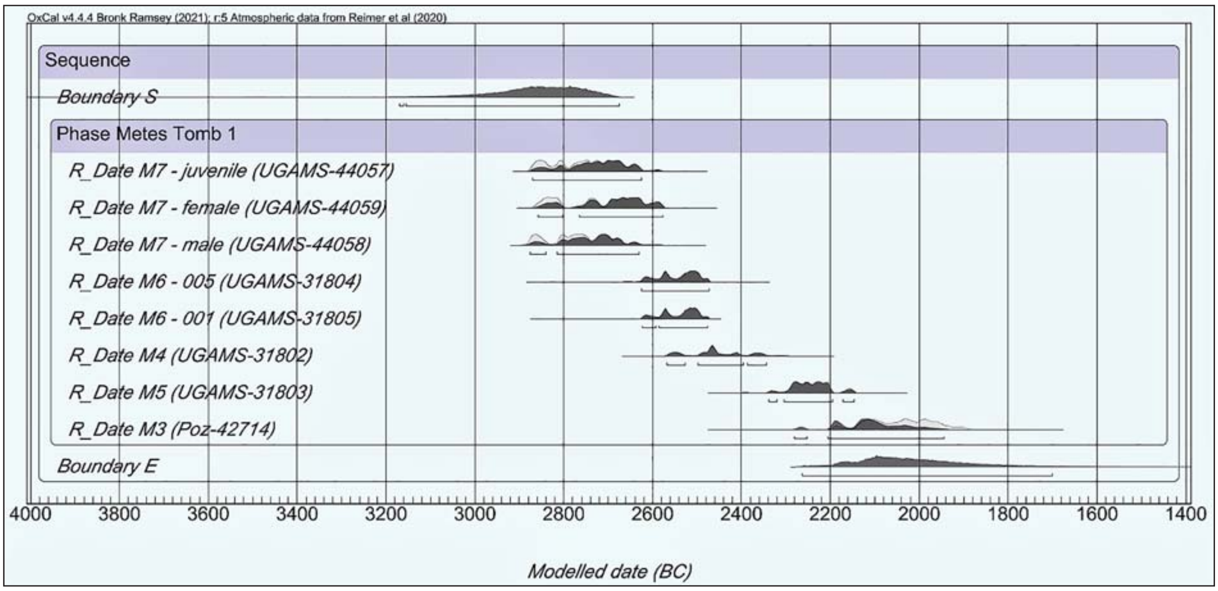


Fig. 12. The Bayesian model for the tumulus at Meteş

revealed that Gr. 6 is a commingled deposit containing at least six individuals (Gr. 6 – *Fig. 11*). Gr. 7-7a consists of a commingled deposit of three individuals: the initial deposition of an adult male, positioned with the skull on the left side, facing east, with limbs bundled (*Fig. 11.6)*, and then another adult female and adolescent deposited directly above it, placed in flexed positions on their right sides, heads facing west. A Livezile-type cup was placed just behind the head of the adult male (*Fig. 11.2–3*). The bone sample taken from the skeleton (UGAMS-44058) produced a date of 4170±25 BP, which places the individual between 2880–2670 cal BC with 2 sigma calibration (*Fig. 12*).

The Livezile-type cup found at Meteş has already been connected with the one deposited in grave 9 (*Fig. 14.1*) in the tumulus at Sárrétudvari-Őrhalom (Dani – Nepper 2006), and it has also good parallels in the tumulus VIII at Ampoita-*Peret* (*Fig. 14.3*) and in the settlement from Cicău (*Fig. 14.2*). The age of grave 9 from Sárrétudvari-Őrhalom (deb 6871: 2859–2489 cal BC, calibrated with 2 sigma) belongs to the same time-horizon as the animal bone (Bln-4624) sampled in the settlement at Livezile-*Baia* (*Fig. 15*). However, it is important to underline that the frog-like position of the legs in grave 9 fits quite well with the one known in the Yamnaya-type burials, including the two graves at Hăpria, but has no parallel in the Livezile graves. As a matter of fact, the theory regarding the Transylvanian origin of some individuals from the Sárrétudvari-Őrhalom tumulus (Gerling *et al.* 2012) was shown to be erroneous, after the strontium and oxygen isotope analyses of six individuals from three different EBA sites in the Apuseni Mountains showed consistent discrepancies (Gerling – Ciugudean 2013). The Livezile character of the ceramics in the graves 4 and 9 (Dani – Nepper 2006) is beyond doubt, but there is no evidence that the origin of the outliers at Sárrétudvari-Őrhalom is the Transylvanian highlands of the Apuseni Mountains, and their regional affiliation may be in another area of Transylvania. The middle Mureş valley might be a better candidate for a contact zone between the Yamnaya newcomers and the Livezile group, the tumulus from Hăpria and the Livezile site at Bărăbant-*Pârâul Iovului* being separated by less than 7 km (*Fig. 2*).

Coming back to the cup deposited in grave 7 at Meteş, it clearly indicates that the emergence of Livezile-type ceramics started quite soon after 2900 cal BC, in a time when late Coţofeni patterns were still in use in remote areas (Rişcuţa – Cosac – Pavel 2012; Popa – Fazekaş 2013). According to our

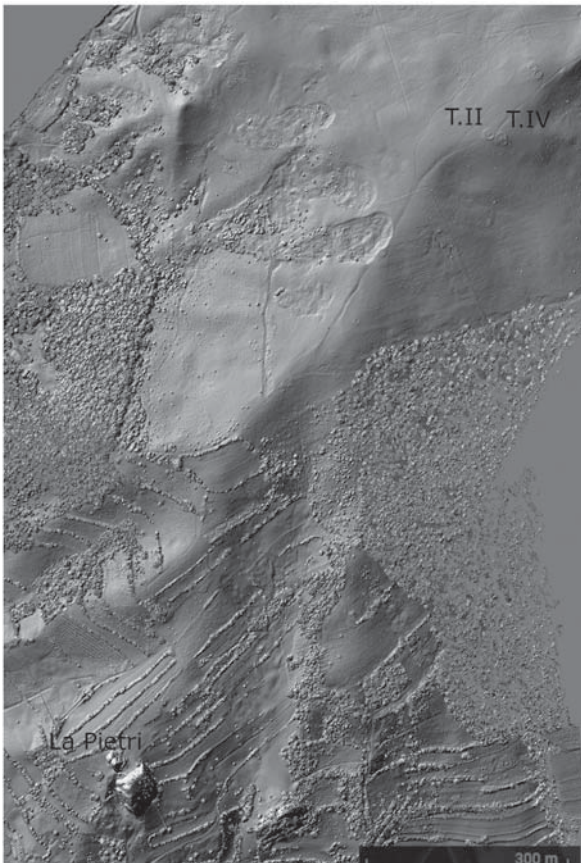
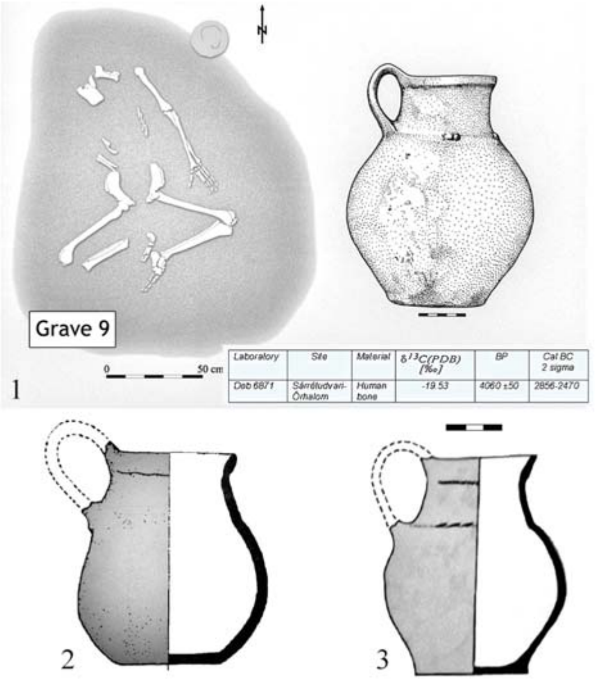


Fig. 13. Drone imagery of the settlement (La Pietri) and tumulus burials at Ampoiţa - Peret



Laboratory	Site	Material	$\delta^{13}C(PDB)$ [‰]	BP	Cal BC 2 sigma
Deb 6871	Sárrétudvari-Őrhalom	Human bone	-19.53	4060 ±50	2856-2470

Fig. 14. The grave 9 from Sárrétudvari-Őrhalom (1) with the Livezile-type one-handled cup and similar cups from Cicău (2) and Ampoiţa-Peret (3) (after Dani – Nepper *2006 and* Ciugudean *1996)*

Bayesian analysis of the skeletons sampled in the tumulus at Meteş, three main phases of interments can be clearly separated in the burial mounds from the Apuseni Mountains (*Fig. 12*). The first phase can be roughly placed between 2850/2800–2600/2500 BC and is represented by the primary grave Gr. 7-Gr. 7a, where the Livezile cup was found. The second phase is represented by the commingled deposit from Gr. 6, where two individuals were sampled (UGAMS-31804 and UGAMS-31804), the results calibrated with 2 sigma being almost identical: 2630–2480 cal BC and 2620–2480 cal BC (*Fig. 12*). This interval overlaps almost perfectly with the radiocarbon date (Poz-42712: 2621–2468 cal BC, calibrated with 2 sigma) from individual 2 in tumulus 2 at Livezile-*Baia*, located in the northern periphery of the cemetery (Gerling – Ciugudean 2013) (*Fig. 15*). Grave-goods are missing in both graves, so it is difficult to connect them with a specific cultural group, but we consider them a benchmark for the end of the Livezile group, the latest examples of which occur around 2500 cal BC.

A possible relation might be suspected with the Soimuş group, whose ceramics have been found in the cremation Gr. 8 in the same tumulus (Ciugudean 1996; Beck – Ciugudean – Quinn 2020). The third phase of interments at Meteş is represented by two other graves, Gr. 4 and Gr. 2, which provided calibrated dates (UGAMS-31802: 2570–2340 cal BC, and UGAMS-31803: 2340–2150 cal BC with 95.4% probability), considerably later than Gr. 6. The age of Gr. 4 corresponds to the one of the graves sampled in tumulus R1 at Florești-Polus (Beta-317258: 2490–2340 cal BC (*Fig. 16*), which are supposed to belong to the so-called Copăceni group (Rotea *et al.* 2014). If the cultural affiliation of the EBA graves at Floreşti is correct, then it is quite clear that Livezile and Copăceni cannot be

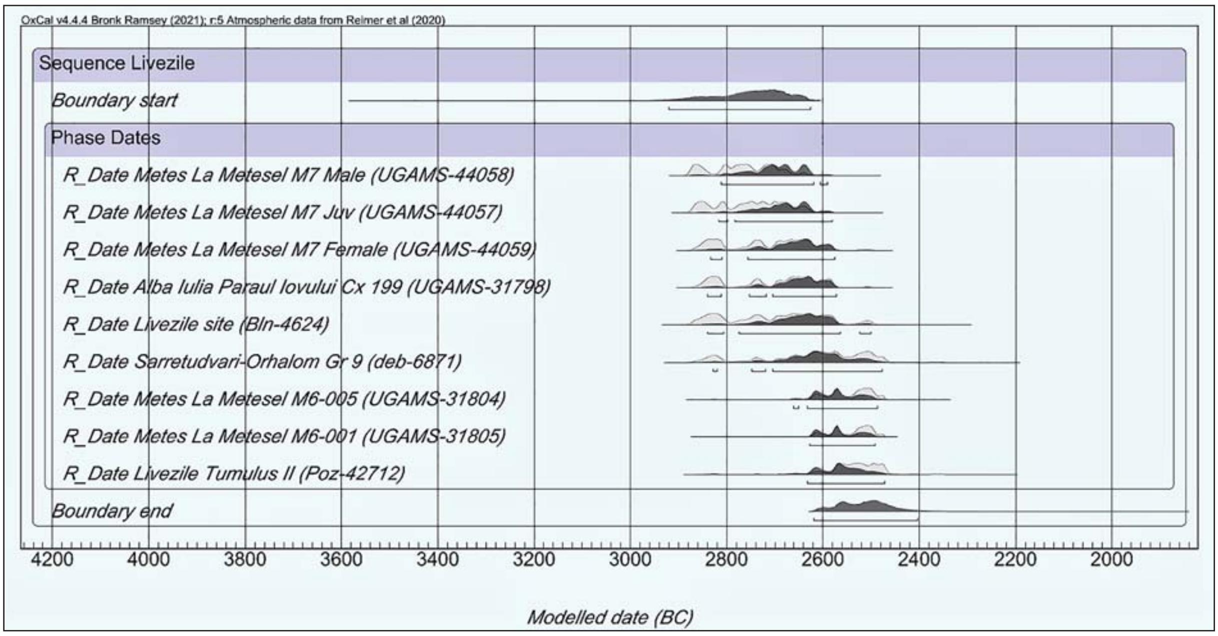


Fig. 15. The Bayesian model for the Livezile dates from Transylvania, also including the date from Sárrétudvari-Őrhalom

identical or contemporary, as some authors are still maintaining (Rotea 2003; 2009; Gogâltan 2015; 2016). In the light of the new radiocarbon dates, our initial proposal for a successive evolution from Livezile to Copăceni (Ciugudean 1996) has now been shown to be correct. Finally, we also have to specify here the existence of a very late interment, represented by Gr. 3 (Poz-42714: 2196–1903 cal BC with 95.4 % probability), indicating probably a secondary burial without any cultural affiliation to the primary graves (Gerling – Ciugudean 2013) (*Fig. 12*). This is not an isolated situation, as MBA Wietenberg cremation graves and ritual pits were often found in the EBA tumuli of the Apuseni Mountains (Ciugudean 1996; 2011). According to the present state of research, the age of Gr. 3 is the time when the Transylvanian lowlands were mostly dominated by the EBA III groups[8], using the characteristic rusticated ceramics (*Besenstrich- und Textilmuster Keramik*), a ceramic style completely missing in the highlands (Ciugudean 1996). The EBA III site at Alba Iulia-*Recea* provided a calibrated date (Hd-29056: 2125–1919 cal BC with 95.4% probability) which fits quite well with the age of Gr. 3 at Meteş (*Fig. 16*), as well as with the radiocarbon dates from EBA III sites in Banat (Gogâltan 2015).

The radiocarbon dates from the tumulus at Meteş are also supported by the dates of the bone samples originating from the Livezile setlements (*Fig. 15*), such as Livezile-*Baia* and Alba Iulia-*Pârâul Iovului*,[9] so that the lifetime of the Livezile group can be estimated to a period of ca 300 years, between 2900/2800–2600/2500 BC (*Fig. 15*). The previous chronological estimations, based on scanty information, have been shown to be prematurely published (Gogâltan 2015; 2021).

According to the present state of research, the Yamnaya graves at Silvaşu de Jos (Diaconescu 2020) and Hăpria have a coeval evolution with the Livezile burials in Transylvania, restricted to the first half of the 3rd millennium BC (*Fig. 16)*. The Livezile interment phase has good chronological connections with

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[8] For the absolute chronology of this extended horizon (Foeni – Iernut - Zoltan), see the radiocarbon dates from the Banat region (Gogâltan 2015) and south-eastern Transylvania (Harding – Kavruk 2013).

[9] The excavations were made by an archaeological team (S. A. Luca, V. Palaghie, and Gh. Natea) from the Brukenthal Museum Sibiu and the results will be published in a future study. The archaeological materials are now preserved in the collections of the Muzeul Naţional al Unirii Alba Iulia.

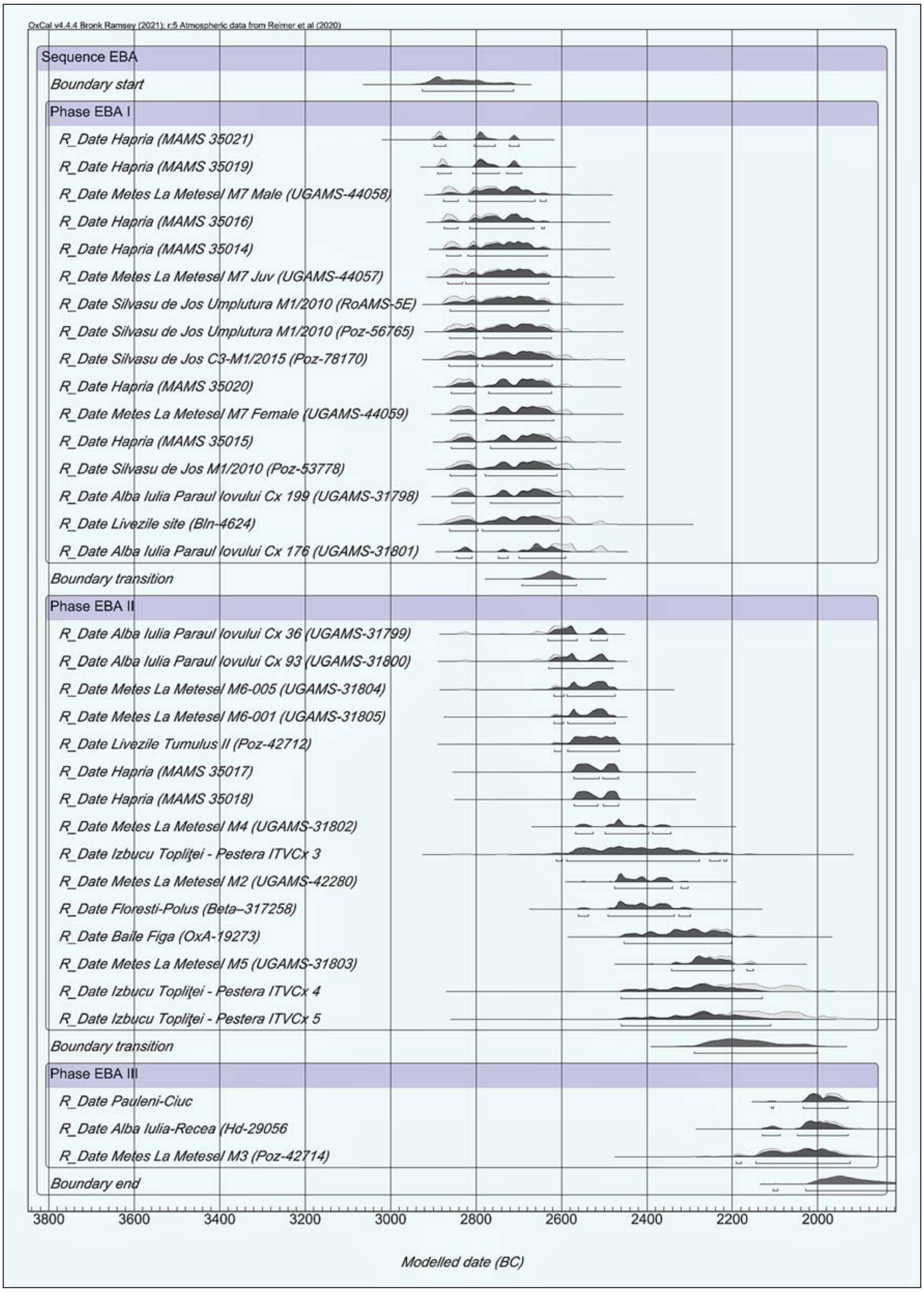

Fig. 16. The Bayesian model for the Early Bronze Age dates in Transylvania

the classical Yamnaya burials in the Lower Danube region (Ailincăi *et al.* 2014; Frînculeasa – Preda – Heyd 2015; Frînculeasa 2021). It also corresponds with part of the so-called Period IV, proposed for the steppe cultures in Hungary (Horváth *et al.* 2013), as well as with the second stage of burials in the kurgans of the Vojvodina region (Koledin *et al.* 2020). This hypothesis does not exclude the existence of tumulus burials before 3000 cal BC, as seems to be the case with the Coţofeni cremation graves at Silvaşu de Jos (Diaconescu – Tincu 2016; Diaconescu 2020), which corresponds to the so-called pre-Yamnaya phase[10] from the Lower Danube (Frînculeasa 2021; Alexandrov 2021) and the Tisza plain (Horváth *et al.* 2013).

Funerary practices and dis/continuities

The arrival of Yamnaya corresponded with several changes in behaviour seen across the Carpathian Basin and Transylvania. However, we must look closely to see if these changes reflect the replacement of people, the diffusion of ideas, or the realignment of local practices in response to a changing social environment. The first shift in behaviour is seen in mortuary practices. Even a cursory examination of the regional record reveals that the movement and redeposition of human remains is a recurring motif in the ritual grammar of the Livezile EBA barrows of southwestern Transylvania. For example, in the multiple burial Gr. 7-7a at Meteș-*La Meteșel*, two adults, a male and a female, were interred together with a 14–16-year-old adolescent (Beck – Ciugudean – Quinn 2020). At Ampoița-*Peret*, assemblages of disarticulated human remains were present in Tumulus II (Grave 7), Tumulus V (Grave 1), Tumulus VII (Grave 2), and Tumulus VIII (Grave 4) (Ciugudean 1996). High levels of disarticulation are likewise reported for multiple graves from Tumulus II at Țelna–*Rupturi*, with at least one commingled grave also observed (Ciugudean 1995; 1996). Indeed, one of the major tracks characterising the eponymous Livezile culture incorporates "disarticulated skeletons, the bones being deposited, in whole or in part, in the form of a 'package'" (Ciugudean 1996, 80). This observation was supported by Motzoi-Chicideanu, who numbered 24 multiple graves out of a total of 65, and considers bone manipulation as one of the characteristic rituals in the Livezile burials (Motzoi-Chicideanu 2011, 311). The tumulus excavated at Hăpria delivered a commingled and disarticulated deposit (ID 766-789) of the skeletal remains of at least five individuals, including one child, one adolescent, and three adults, consisting predominantly of cranial and appendicular remains (*Fig. 3.7*).

Such practices extend beyond Transylvania to western Moldavia – at the Bronze Age site of Costișa–*Cetăţuia* (Neamţ County), several graves and isolated human skeletal elements were found scattered throughout the site (Popescu – Soficaru – Mărgărit 2016, 83). A commingled deposit (Gr. 2) discovered in the same site contained five skeletons and was radiocarbon dated between 2620–2470 cal BC (95.4% probability). The time span corresponds quite well with the dating of Gr. 6 at Meteş and with the date from tumulus II at Livezile-*Baia* (*Fig. 15*). No less important is the fact that the ceramic offerings have good parallels at Aldeşti, Folteşti and Zăbala, as well as in the Livezile group (Popescu – Băjenaru 2008, 68). As for the regions between the Prut and Dniester rivers, the presence of secondary depositions of human remains have been documented in 26 burials at Yamnaya sites (Agulnikov – Popovich 2010). The researchers date these burials to the end of the 3rd and beginning of the 2nd millennium BC (based on relative dating techniques), well after the initial interaction between Steppe-migrants and local EBA communities in the Carpathians. Nebrat (2013) and Lysenko and Razumov

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[10] In a recent study, D. Anthony supports a different chronology, based on new radiocarbon dates. These dates suggest that early Yamnaya sites and assemblages began to appear about 3300–3200 BC. Late Yamnaya, correlated with Mikhailovka level III, is dated 3000 BC and later (Anthony 2021).

(2016) document disarticulated secondary remains in the North-West Black Sea region. These secondary deposits are associated with the Ingul Katakombnaya culture, an archaeological culture that post-dates the Yamnaya (starting around 2800 BC) (Otroshchenko 2013).

Despite their abundance in Transylvania, manipulation of bones and secondary deposits have not been previously identified as an important part of Yamnaya cultural practices south of the Carpathians (Frînculeasa – Preda – Heyd 2015). It is important to note that an early post-mortem manipulation of disarticulated remains was documented in a collective grave (Gr. 1) at Ariceștii-Rahtivani-*Movila pe Răzoare* that was associated with Coțofeni material culture (Frînculeasa 2020a). Commingled deposits and the post-mortem manipulation of bones are even considered characteristics of the pre-Yamnaya horizon in the Prahova region (Frînculeasa 2021). A recent discovery of a burial with incomplete human remains has been made in Vojvodina at Žabalj-*Medisova humka* (Jarosz *et al.* 2021), and it was radiocarbon dated between 2858–2625 cal BC (68.2% probability). Overall, the Early Bronze Age mortuary record across the Transylvanian region thus shares a series of common mortuary motifs, including the skeletonization and disarticulation of some assemblages of human remains prior to deposition in mortuary mounds, the commingling of multiple individuals in single graves, and the coexistence of multiple forms of funerary treatment within the larger mortuary sphere of the mounded upland tomb cemetery.

Given that bone manipulation and secondary depositions are observed across a wide variety of cultures and time periods, the social significance of this practice must not be simplified in an effort to create a singular explanation for its role in mortuary programs. Instead, we must contextualize discussions of secondary depositions in Transylvania in their direct historical context.

The second major change in mortuary behaviour coincident with the arrival of Yamnaya is the link between EBA cemeteries and Coțofeni sites, seen both at Hăpria and Râmeţ, which is part of a broader pattern of EBA communities transforming Late Copper Age settlements into mortuary spaces. Clay hearths, together with Coțofeni ceramics, have been found in the central area of several mounds, at Ampoiţa-*Peret*, Livezile-*Baia* (Ciugudean 1991; 1996; 1997; Gerling – Ciugudean 2013), Cetea-*Picuiata* (Popa *et al.* 2006). A similar situation has been identified in the cemetery at Cheile Aiudului, where several mounds covered Coțofeni III occupation deposits, with fire marks and broken pottery. A vessel with burnt grains, associated with a clay idol of Bucranium-type (*Fig. 17.1–2*) was found in the area of tumulus V[11] and clearly testifies traces of ritual activities performed prior to the first setting of burials (Vlassa – Takács – Lazarovici 1987; Ciugudean 1996). In some cases, such as Ampoiţa-*Peret* (Ciugudean 1991; 1996; 2011), habitation debris was transported more than 1 km from the settlement to be incorporated into the mounds (*Fig. 13*). This demonstrates that EBA communities deliberately incorporated settlement debris into mounds and that it was not only the result of being close at hand when constructing tombs. In Messenia at Kastroulia, the fill of the two Middle Helladic I mounds has yielded a large quantity of almost exclusively Early Helladic II pottery, although the nearest EH II settlement is located on the opposite side of the river (Müller-Celka 2011). Like at Ampoiţa-*Peret*, this suggests people intentionally transported and included earlier deposits into the mounds.

The transformation of the domestic space into community monument is a practice well known elsewhere in Europe. In southern Greece, a former EH II building was interred in a tumulus at Thebes (Maran 1998, 227–228). At Lerna, after the end of Lerna III, a low circular mound formed of debris from the destruction of the "house of the tiles" covered almost the entire area of the building (Aravantinos – Psaraki 2011, 409). The construction of these monumental earthworks signifies respect for the domestic units they cover.

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[11] Similar idols were discovered in the Coţofeni settlement at Boarta (Dumitraşcu – Togan 1971, pl. 6/419), as well as in the Vučedol C settlement at Dunaszekcső-Várhegyről (Ecsedy 1985, pl. 8/5).

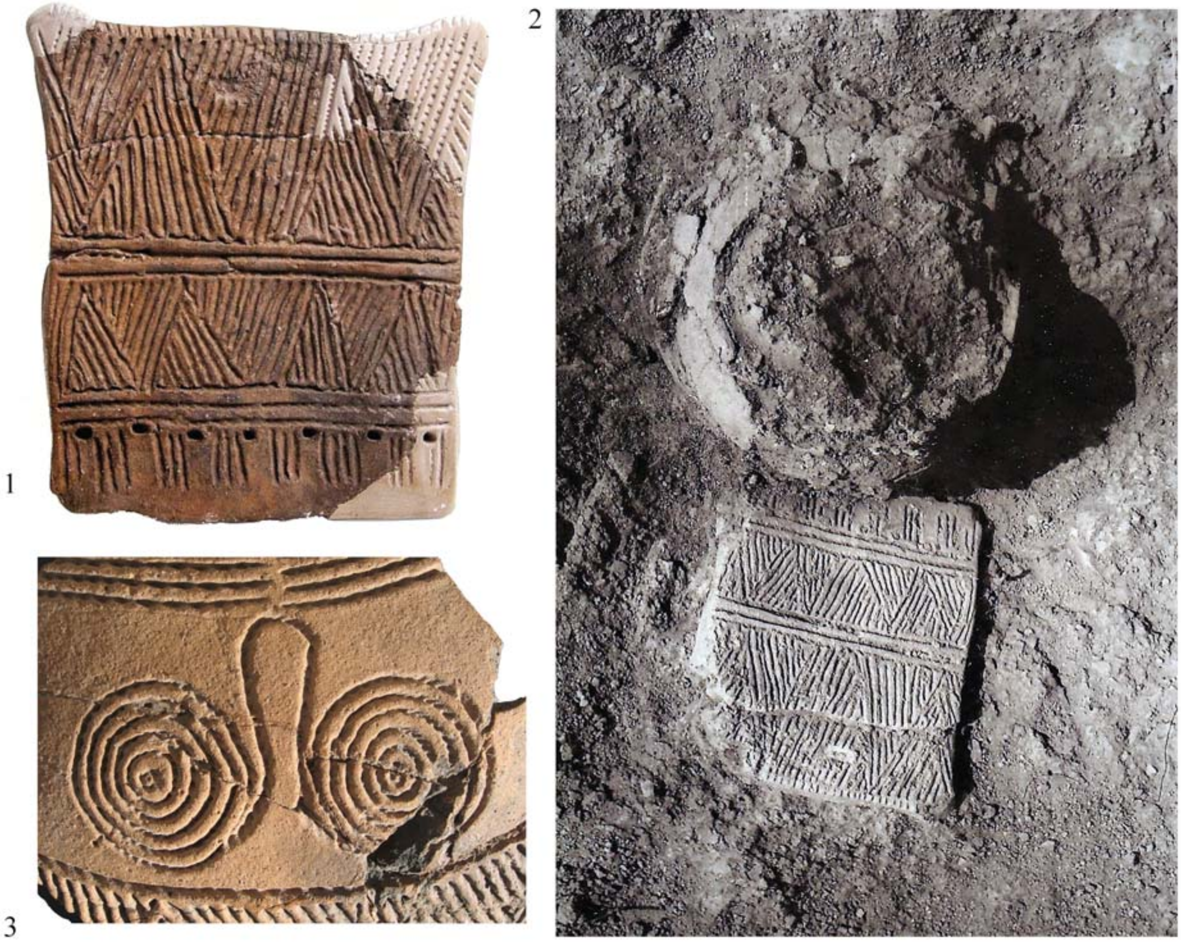

Fig. 17. Clay idol of Bucranium-type from the EBA cemetery at Poiana Aiudului (1), and view in situ of the pot with grains and the idol in tumulus 5 at Poiana Aiudului (2), the reproduction of a spectacle-shaped pendant on Coţofeni III ceramics from Sebeş-Râpa Roşie (3) (Photos by Horia Ciugudean)

The burying of the "house of the tiles" may represent not only the end of the social life of this specific unit but also the end of the specific social reality of the EH II period (Wiencke 2000, 297–298).

There are other cases outside of Transylvania of Copper Age sites being transformed into EBA cemeteries. South of the Carpathians there are similar cases where Yamnaya mounds were often built over Cernavodă II–Folteşti II sites (Frînculeasa 2020a, 44). The situation becomes more complex in the case of several tumulus burials where Cernavodă II pottery was part of the grave-goods too (Frînculeasa 2020b). In Messenia, the burial mound at Voidokilia provides a clear example of recycling an earlier domestic space into a burial ground. Traces of ritual activities under the mounds at Olympia-New Museum, Ayios Ioannis and Routsi suggest community rituals – even if not funerary – were performed prior to mound construction. The evidence therefore allows the hypothesis that the monumental and ritual functions preceded mortuary functions (Müller-Celka 2011, 421–424). This hypothesis can be applied as well towards part of the Transylvanian EBA mounds, and in this case, it might force us to revive Vlassa's older theory about the internal chronology of the Poiana Aiudului cemetery: an earlier Coţofeni phase, followed by a post-Coţofeni one (Ciugudean 1977, footnote 13; 1986, 69, 72; Vlassa – Takács – Lazarovici 1987).

It cannot be ruled out that the descendants of the Coțofeni people also took part both in the rituals performed on the Râmeţ-*Gugu* hilltop and in the building of the monument itself. Only the presence of genetic affinity between the Coțofeni and Livezile individuals would certify (or disprove) the validity of this hypothesis. A distinction must be made, however, between the sites where the Livezile barrows were laid over deserted Coţofeni settlements and sites where the late Coţofeni descendants transformed domestic space into community funeral monument. In the lowlands, the situation might be quite different and Hăpria seems to represent the case of an earthen mound built over the debris of a Coţofeni III house by a Yamnaya community. The meaning of this act is also completely different, the kurgan representing the manifestation of possession and territory (Heyd 2011; Dani 2020).

The strong persistence of the Coţofeni ancestry, particularly in the highlands, could be a plausible explanation for the birth of the new EBA Livezile group,[12] which still use some Coţofeni decoration patterns and pottery shapes (Ciugudean 1996; 1997). But it is not enough to explain the presence of many other new patterns, part of them also present in the Zăbala-type finds from south-eastern Transylvania, as well as in the Cernavodă II-Folteşti repertory or the Aldesţi-type finds from Moldavia (Ciugudean 1996; 2013; Burtănescu 2002).

The earlier dates of the burials associated with Coțofeni pottery in the mounds at Ariceştii-Rahtivani (Frînculeasa *et al.* 2014; Frînculeasa 2020) point towards a late 4th millennium BC beginning of a close relationship between western Transylvania and the sub-Carpathian area of Prahova. Coțofeni III communities came into contact with groups beyond the bounds of the Carpathian Mountains, including communities in northern Oltenia (Ţuţulescu 2016a, 140; Ţuţulescu 2016b) and the Cernavodă II–Folteşti II people living between the Danube and southern Carpathians (Frînculeasa 2020a). Cernavodă II groups made their appearance in south-east Transylvania around 3000 cal BC, maybe as a result of the Yamnaya expansion along the Lower Danube (Heyd 2011; Frînculeasa 2020b; Preda-Bălănică – Frînculeasa – Heyd 2020). Evidence for these groups might be seen in the Zăbala-type ceramics (Székely 1997), as well as in the movement of the southern askos-type jugs, deposited in the graves at Sânzieni and Turia (Roman 1986; Motzoi-Chicideanu 2011). The large hilltop Coţofeni settlements, such as Boarta, Șincai, Măgura Căpudului (Ciugudean 2000), seem all to cease their evolution by the end of phase IIIb, at ca. 2900 cal BC, when the first Yamnaya groups crossed from Banat to Transylvania through the Iron Gates of Transylvania,[13] and the Mureş valley (*Fig. 1*). This chronological frame is well documented both at Silvaşu de Jos and Hăpria, where the first burials of Yamnaya individuals cannot be earlier than 2900 cal BC, as the radiocarbon dates clearly show (*Fig. 16*). The displaced late Coțofeni population of central and south-western Transylvania, mixed with the Cernavodă II–Folteşti II groups, that were already a local presence in the south-east of the region, have given birth to the Livezile group, mainly distributed over the upland regions of the Apuseni Mountains (Ciugudean 2013, 20; 2021, 57–59).

Together, these lines of evidence combine to confirm that the movement of Yamnaya communities into the Carpathian Basin and lowlands of southwest Transylvania did not result in a full rupture and replacement of the people and traditions of the Late Copper Age landscape. This view supports the call for a more complex social context of large-scale migration in European prehistory.

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[12] Some Romanian researchers still preffer to call it either the Coţofeni IV phase (Lazarovici 1997; Tuţulescu 2016a) or an "epi-Coţofeni" phenomenon (Rişcuţa 2008). Ignoring the absolute chronology of the radiocarbon dated finds, a few others include all the Livezile sites into the so-called Copăceni group (Rotea 2003; 2009; Rişcuţă – Popa – Ferencz 2009; Popa 2012; Bereteu – Rotea 2022).

[13] We consider the use of this easy mountain path, which better explains the location of the Yamnaya cemetery at Silvaşu de Jos, as a more accesible route than travelling through the Mureş valley (Diaconescu 2020). Most of the prehistoric populations coming from the Banat region seem to follow the same route and reach the middle Mureş valley in the Simeria area (see the distribution of the Middle Bronze Age Balta Sărată group, the Late Bronze Age Susani finds, or the Early Iron Age Basarabi culture). The Roman army marched along this path as well, and fought a battle with the Dacian army in the area at the beginning of the 2nd century AD.

Carpathian Basin influence of the steppe

An element of Yamnaya migration that is often overlooked is the effect that its interactions with the local societies had on the Eurasian Steppe. Yamnaya would have been changed by having interacted with the Late Copper/Early Bronze communities in the Carpathian Basin and Transylvania. The trade and social relationships that developed between local groups and Yamnaya newcomers resulted in a flow of material and ideas to the Eurasian Steppe to the east. One good example consists of the copper spectacle-shaped pendants, which are found in a few eastern Yamnaya contexts, but have their origin in Transylvania, where they are present before and after Yamnaya migration (Ciugudean 1996; Popa 2011; Preda 2015; Frînculeasa *et al.* 2020). The earliest copper-spectacle shaped pendants were found in the areas of central north-east Europe (Jordanow/Brześć-Kujawski and Lublin-Volhynia cultures), primarily in funerary contexts (Matuschik 1996; Wilk 2018). Together with the southern Alpine group of engraved representations, which are considerably later (Harrison – Heyd 2007; Derenne – Ard – Besse 2020), they represent an Old European Late Neolithic/Copper Age fashion. Several depictions of spectacle-shaped pendants have been documented on Coțofeni III pottery (Ciugudean 2002; Popa 2013) (*Fig. 17.3*). These clearly prove that the pendants were produced and used in Transylvania prior

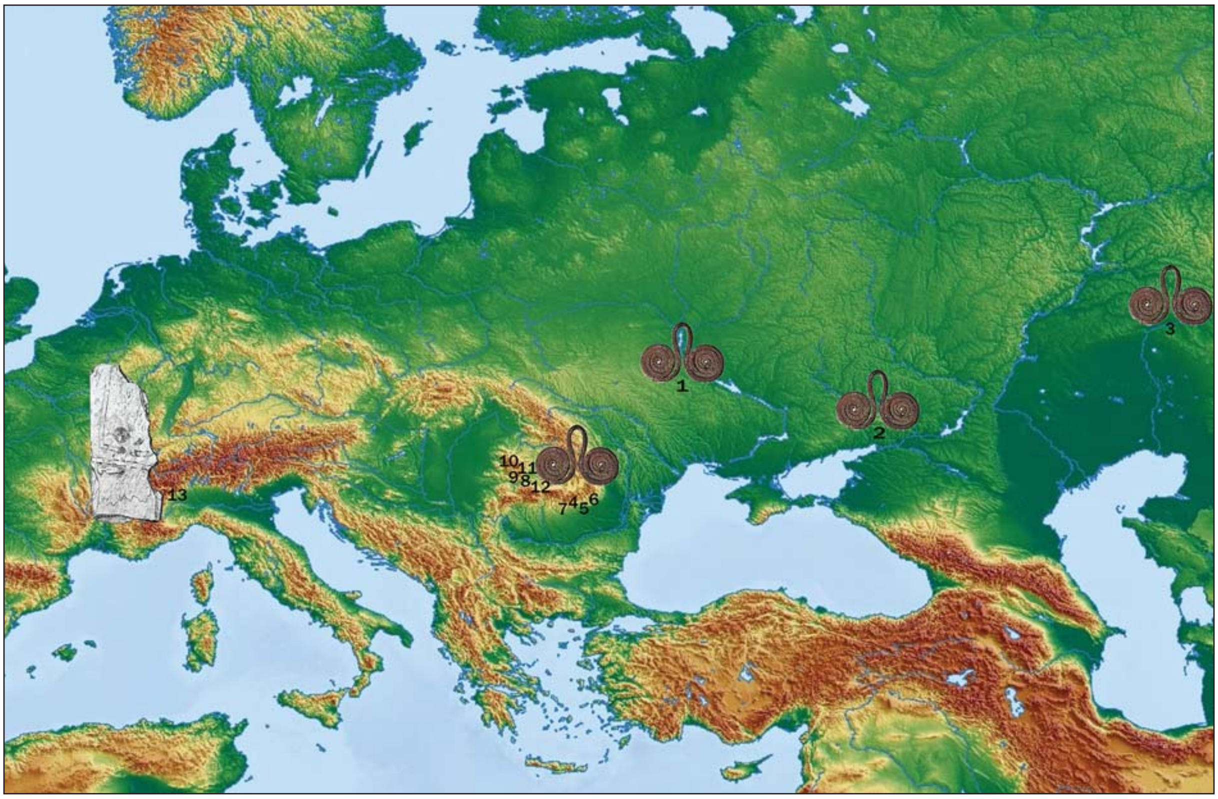

Fig. 18. Distribution of the spectacle-shaped copper pendants on the territory of Romania and in the Pontic-Caspian area in late 4th – 3rd millennium BC: 1. Dobrovody, 2. Krivaya Luka, 3. Ilekshar, 4. Blejoi, 5. Ploieşti, 6. Şoimeşti, 7. Ariceştii-Rahtivani, 8. Ampoiţa, 9. Mada, 10. Poiana Aiudului, 11. Livezile, 12. Transylvania (unknown location). The location of the Sion stella in the Alps (13) is also represented on the map

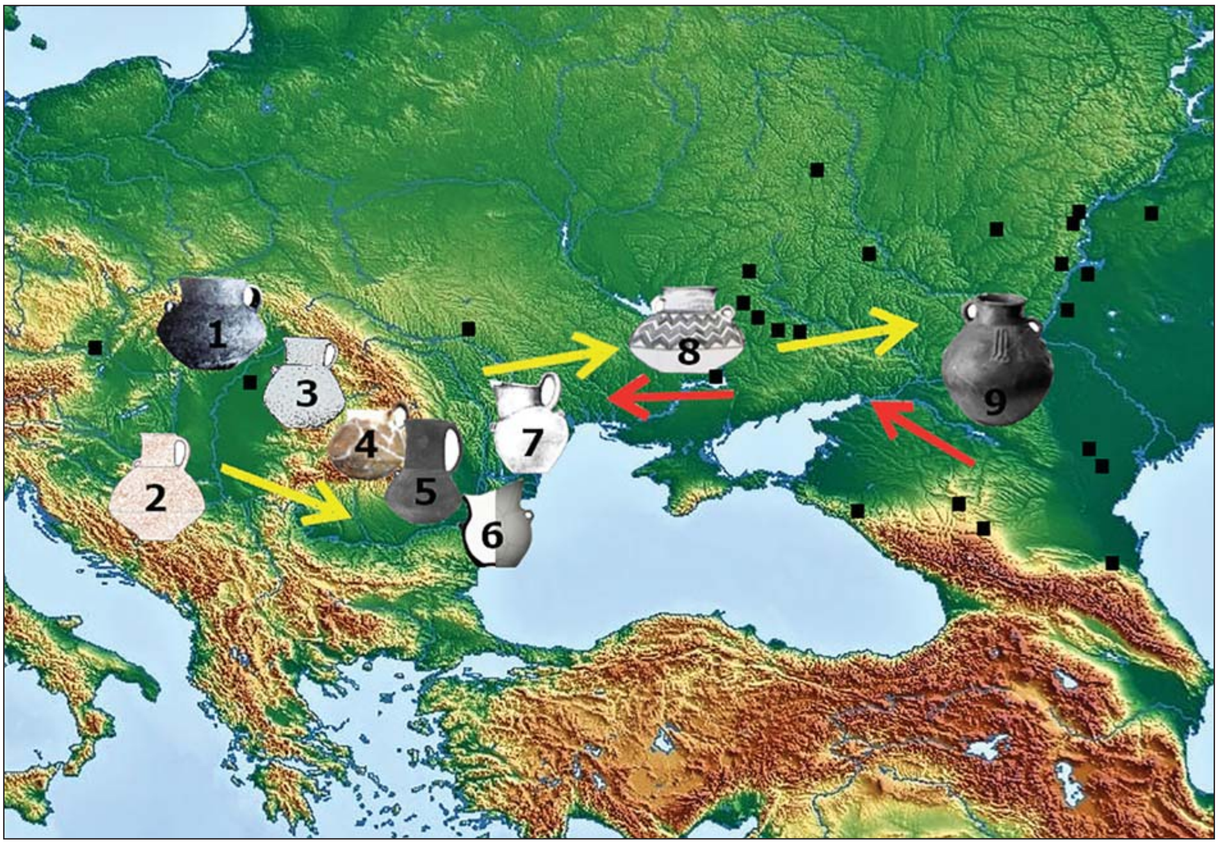

Fig. 19. Selected distribution of the EBA vessels with asymmetrical handles in southeast Europe and Pontic-Caspian area: 1. Tarnazsadány, 2. Vinkovci, 3. Izbucu Toplіţei, 4. Caşolţ, 5. Budureasca, 6. Casimcea, 7. Matroşka, 8. Sofievka, 9. Remontnoe (The yellow arrows indicate the direction of diffusion for the vessels with asymmetrical handles; the black dots indicate the finds of Manych-type daggers according to Zimmermann *2003; the red arrows indicate the direction of diffusion of the daggers)*

to the end of 4th millennium BC. Copper spectacle-shaped pendants were included as grave goods in a considerable number of EBA mounds in Transylvania, such as Ampoiţa, Poiana Aiudului, Livezile and Mada (Ciugudean 1996; Popa 2011; Preda 2015; Frînculeasa *et al.* 2020) (*Fig. 18*). Outside the Transylvanian region, there are four other Romanian sites where spectacle-shaped pendants were found in funerary contexts: Ploieşti-Triaj, Blejoi, Ariceştii-Rahtivani and Şoimeşti (Preda 2015; Frînculeasa *et al.* 2020; Frînculeasa 2021) (*Fig. 1*). The Şoimeşti grave was radiocarbon dated between 2891–2679 cal BC (calibrated 2 sigma), which is contemporaneous with the Livezile horizon of the burials at Meteş (*Fig. 12*).

Copper spectacle-shaped pendants in the tumulus burials at Dobrovody (Bunyatyan – Nikolova 2010), Krivaya Luka (Shishlina 2008) and Ilekshar (Tkačev 2013) (*Fig. 18*) are examples of a copper ornament of Carpathian origin spreading through eastern nomadic societies.[14] It should be noted that the radiocarbon dates available for part of these finds place them after 2500 BC (Shishlina *et al.* 2007), in what it is usually called the late Yamnaya/Katacombnaya horizon (Rassamakin 2011; 2013; Kaiser 2019). At the same time, Manych-type daggers expanded to the west (Zimmermann 2003), one of the most western examples being the piece found in grave 7-7a at Sárrétudvari-Őrhalom (Dani

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[14] Most of the Romanian archaeologists support this idea (Preda 2015; Frînculeasa 2021), but there are also those who hold an opposing opinion, who contest the Carpathian origin of such finds (Gogâltan 2016).

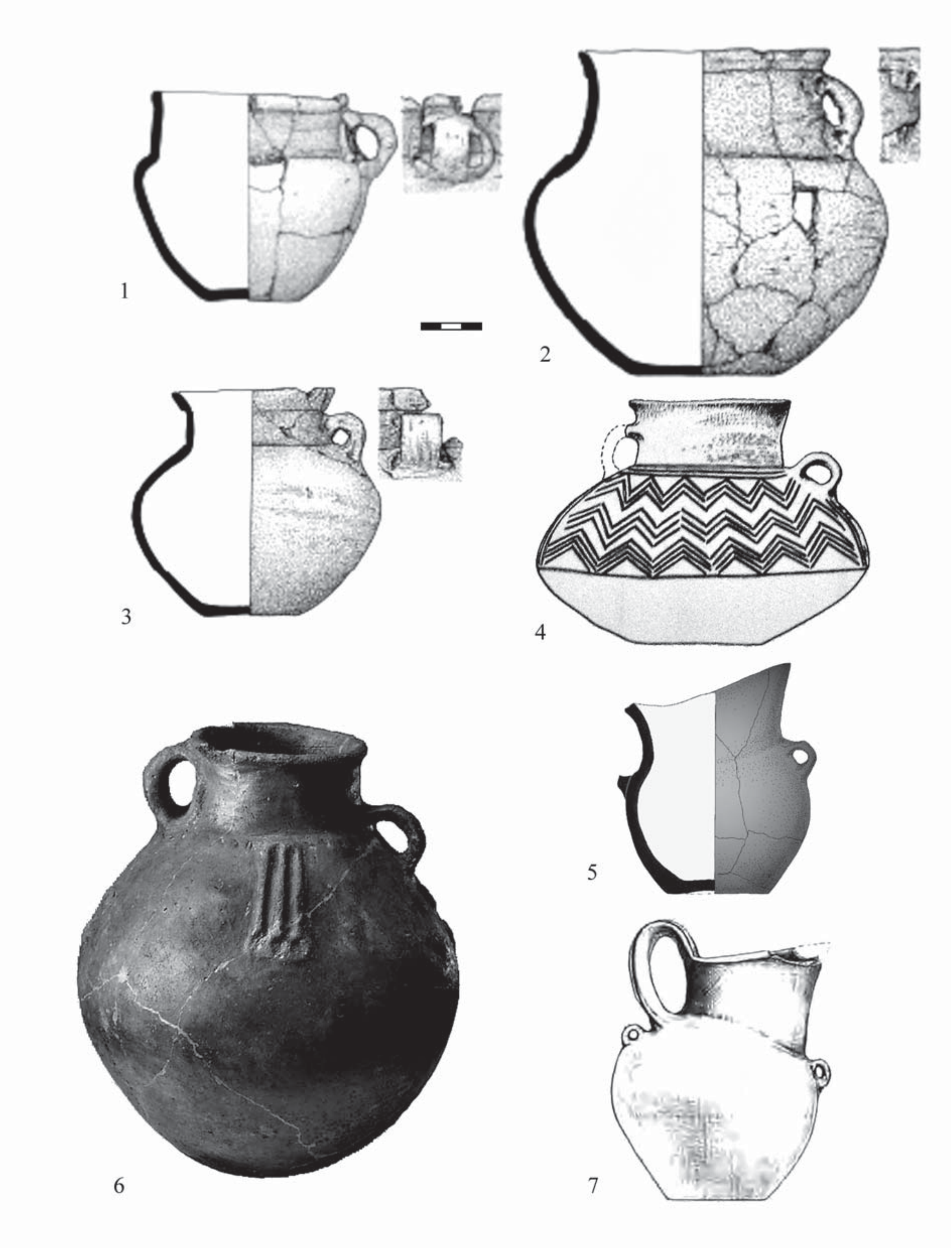

Fig. 20. Vessels with manchette-like rims from the Baga-Burul cemetery (1-3) and vessels with asymmetrical handles from Sofievka (4), Casimcea (5), Remontnoe (6); and Matroska (7) (after Ivanova 2013; Vasiliu – Mocanu – Paraschiv 2014; Shishlina 2013; Ghemis et al. 2020)

– Nepper 2006) (*Fig. 19*). This is clearly a later burial, closer to the middle of the 3rd millennium BC, according to the calibrated date (Dani – Kulcsár 2021). These lines of evidence illustrate a two-way trade and possible exchange of gifts between the late Yamnaya/Katacombnaya immigrants and the local population. The mound from Smeeni, as well as other discoveries, has offered solid evidence that a few Katacombnaya groups reached the Lower Danube area (Frînculeasa *et al.* 2017, 138–151).

There is also evidence for the movement eastward of EBA Carpathian ceramics towards the Pontic and North Caucasian steppe tribes (Rassamakin – Nikolova 2008; Kaiser 2013; 2019, 244–245; Ivanova 2013, 95; Frînculeasa 2021, 177–180). In particular, the import or imitation of vessels with asymmetrical handles illustrates the long and strong influences coming from the Carpathian-Balkan area towards the EBA steppe societies (Rassamakin – Nikolova 2008). The distribution of this ceramic type (*Fig. 19*) includes finds from Casimcea (Vasiliu – Mocanu – Paraschiv 2014), Matroska (Ivanova 2013), Sofievka (Rassamakin – Nikolova 2008), and, probably the most eastern one, the Ulan 4 cemetery at Remontnoe (Shishlina 2013) (*Fig. 20.4–7*). Not far from it, the West-Manych tumulus-burials at Baga-Burul delivered an impressive number of ceramic vessels with Carpathian-Balkan shapes and patterns, including the over-turned (manchette) rims (Shishlina – Gak – Samoilenko 2010) (*Fig. 20.1–3*). Influences of the Glina III – Schneckenberg ceramics in the late Yamnaya horizon from the southern Bug – Ingulets rivers area have already been proposed (Shaposhnikova – Fomenko – Dovzhenko 1986), and even if the cultural denomination is not the correct one, it is related to the same phenomenon.

The transfer of the cross footed bowls decorated inside from south-eastern Europe to the Yamnaya culture represents another important indicator of a west to east vector of exchange, despite the fact that the archaeological literature mainly highlights the exchange moving in the opposite direction. Kaiser (2013) suggested that the interior decorated bowls of the Vucedol culture and contemporaneous cultures of southeastern Europe served as a model in the construction of the censers of the Yamnaya culture in the Dniepr region. Although Kaiser is cautious to ascertain the extent to which the production of censers in the Katacombnaya culture is the result of an influence from the southeastern European cultures, the imitation of other types of vessels, as in the examples we previously presented, provides strong support for such a theory.

Conclusion

The archaeological record of Transylvania during the Late Copper Age and EBA is evidence of a dynamic context of migration, interaction, social change, and continuity. While the effect of the spread of Yamnaya from Eurasian Steppe towards the west has been a major focus of archaeological research, in this study we hope to highlight the need to take a more nuanced perspective. Within Transylvania and the Carpathian Basin, the introduction of Yamnaya ideas did not necessarily result in the full abandonment of Early Bronze Age traditions or the replacement of local populations with newcomers. Instead, local communities responded and shifted some practices, while maintaining a strong connection to their ancestry through the reuse and repurposing of space. As in any dynamic social context, Yamnaya and their descendant communities adopted and moved things and ideas from the west to the east. In light of the data presented here, we argue that a more complex view of the Yamnaya migration is needed.

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East European elements in burial rites of the Moravian Corded Ware Culture. Wagon burial in Moravia in the 3rd millennium BC?

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Abstract

The generally accepted origin of the Corded Ware Complex is logically reflected in the material culture of its Central European groups, which exhibit many East European elements. The discussion about the intrusion of Yamnaya culture into the heart of Europe and its genetic legacy would thus be reflected not only in burial rites or in the social sphere, but also in material culture of Corded Ware people. Were there perhaps some direct contacts between Central Europe and the Black Sea-Caucasus region at the beginning of the 3rd millennium BC? We will try to find out, using the example of the Moravian group of Corded Ware Culture (MCWC). We are able to follow up many phenomena and elements outside the territory of Moravia, in its vicinity, both during the existence of Corded Ware culture and in the cultures existing immediately before and after this period. J. Ondráček (1965) has documented the south-eastern influences on ceramic production during the local development of MCWC. The comparison of relations to East Europe based on the defined "Yamnaya package" (Harrison – Heyd 2007) reveals many accordances as well as differences. In addition to the earlier-known entities (individual inhumation burials under barrows, total absence or a low number of settlements, cord-ornamented pottery, bowls decorated on both inner and outer surface, stone hammer-axes, composite necklaces, etc.), typical elements of Yamnaya and Catacomb cultures appear as a novelty or in larger amounts (inner constructions in grave pits, metallurgists' graves, clay funnels, tanged daggers and other copper industry, shaft-hole axes, crook/hammer-headed bone pins, bone tubes and the so-called pan flute, bone/metal solar discs, etc.). The most significant new finding is a concentration of MCWC graves with ruts in the bottom, whose dimensions are analogous to those in East European wagon burials (Yamnaya and Catacomb cultures). Surprisingly enough, almost identical analogies are found in a wider European territory much later, in the Hallstatt and La Tène Period elite graves. Previous calculations and reconstructions, including a surprisingly successful attempt to project a wagon model from Trialeti into the ground-plan of our grave pits, support this idea. The absence of any wagon components (except the ruts) indicates the presence of an all-wood four-wheeled ceremonial wagon used for the burial of some selected individual with no special social status, similar to those that were used within a wider Black Sea region. The confirmation of this bold hypothesis would provide another clear proof of direct contacts between the two above-mentioned regions during the 3rd millennium BC and a strong argument to support the results of accomplished archaeogenetic analyses.

Key words: *Corded Ware culture, Yamnaya and Catacomb cultures, Yamnaya package, East European influences, wagon burials*

Introduction

In view of the persisting and generally accepted opinion that the Corded Ware Complex originates from East Europe (Buchvaldek 1986; Kristiansen 1989; Anthony 2007; Włodarczak 2008; 2017;

Kadrow 2008; Kristiansen *et al.* 2017 and others), it is in no way surprising that the material culture of as good as all Corded Ware groups contains many East European elements (fading out in western direction). The topic of infiltration of Yamnaya culture into the heart of Europe and its genetic inscription and legacy is still being vividly discussed (Brandt *et al.* 2013; Lazaridis *et al.* 2014; Allentoft *et al.* 2015; Haak *et al.* 2015; Mathieson *et al.* 2015; Kristiansen *et al.* 2017; Heyd 2017; Olalde *et al.* 2018; 2019; Juras *et al.* 2018; Furholt 2019), although recent archaeogenetic analyses do not show a direct genetic link between Corded Ware and Yamnaya cultures (Papac *et al.* 2021). This event should be reflected somehow not only in burial rites and in the socio-economic sphere, but also in the material culture of Corded Ware people. It is to remark that the relationship between the two above-mentioned complexes (Yamnaya vs. Corded Ware) is not yet satisfactorily elucidated. Provided that there were any direct contacts with the Black Sea-Caucasus region at the turn of 4th–3rd millennia BC or at the beginning of the 3rd millennium BC: are we able to identify these contacts in the material content of Corded Ware Culture? We will try to do so on the example of the Moravian group of Corded Ware Culture (MCWC), although it is clear that many phenomena and entities did not necessarily occur in Moravia. The relations to East Europe have already been followed up on the basis of the earlier-defined "Yamnaya package" (Harrison – Heyd 2007), so we can try to verify these connections.

Transformation and implementation of the "Yamnaya package" in the MCWC material culture

Social sphere

Tumuli and tumulus cemeteries, burial rites

An identical common feature is represented by circular barrows (group of East Moravian barrows: Turek – Peška – Matějíčková 2011; Hejcman *et al.* 2013) of simple constructions (in contrast to Yamnaya and Catacomb cultures), which are now only partly visible in terrain. The position of barrows is often indicated only by a considerable distance between individual graves (Peška 2017) – in vast majority inhumation burials (cremation has been considered to originate from the Carpathian Basin) in rectangular grave pits. The supine position of the upper body with contracted lower extremities lying on the right or left side (*Rückenhocker*) is slightly predominant. The true contracted burial, where the whole body is lying on the right or left side, is relatively frequent (Peška 2013, 119). The orientation of graves is quite variable and sexual differentiation is strictly observed. Funerary customs are much more complicated in the territory of East Europe. In Maykop Culture, inhumation was practiced in a contracted position on the right side, with the head turned to the north. Later (Yamnaya and Catacomb cultures), a stretched position or right-sided contracted position were practised with E–W orientation, and the so-called *Rückenhocker* or *rhombischer Hocker* are also frequent (Häusler 1974; 1976; 1998; 2004). The predominant orientation in Moravia is that along the N–S axis with some deviations, including the group of East Moravian barrows (Čižmář – Geisler 1998, 77–78; Šmíd 1998, 125; Peška 2017, 32–34). The W–E axis is less frequent (Central Moravia 5.38 %, remaining territory 9.2 %, along the motorway section Brno–Vyškov 14.3 %, but the section Vyškov–Mořice only 6.25 %), similarly as in Lesser Poland (7%: Włodarczak 2006, 58–63, Ryc. 35).

In the territory of Yamnaya culture, organic substances were typically used to adjust the grave pit or the burial itself, and red ochre also is a frequent phenomenon (not in Moravia). The practiced burial rite is solely inhumation, sexual differentiation is not preferred, and the W–E orientation is strictly observed (Ivanova – Toshchev 2015, Fig. 17). The frequently occurring so-called frog position probably resulted from a supine burial with contracted lower extremities in a raised position (Häusler 1974; 1976; 1998; 2004). Leaving aside the maybe still Mesolithic-Neolithic complex of Lepenski Vir and the exceptional Early Neolithic burials of "thinkers" (Manzura 2009, Abb. 9:1,9), we meet this custom in the Yamnaya culture (Ukraine, South Russia, East Hungary) and Fatyanovo Culture; in the Central European territory, it can be detected in the Corded Ware culture (East Slovakia, South Poland), sporadically in the Bell Beaker culture (BBC) (Sandomierz) and, further on, over the Early Bronze Age (Nitra, Košťany, Únětice), exceptionally until as late as the Middle Bronze Age (Tápé: Stuchlík 2000, 292). From the above enumeration arises that this phenomenon has occurred over more than 700–900 years (!).

In the territory of Yamnaya and Catacomb cultures, we can find much more examples of monumental tumuli, intricate constructions of grave pits with internal adjustments and wood lining, sometimes combined with anthropomorphic stelae (which are not evidenced in Moravia). Some analogies are known in the Balkans, in the Carpathian Basin, but also in the territory of Bell Beaker culture in West Europe (Spain: Heyd 2017). Anthropomorphic stelae with identical depiction of shoes/sandals occur both in the east (here already in Maykop culture – Nalchik; Yamnaya culture, Plachidol II, T. I and other) and on the Iberian Peninsula, surprisingly in the Bell Beaker culture. The distance between these parallels is 4,500 km (Heyd 2017, 354, Fig. 4). On Iberia, also important are several graves of large

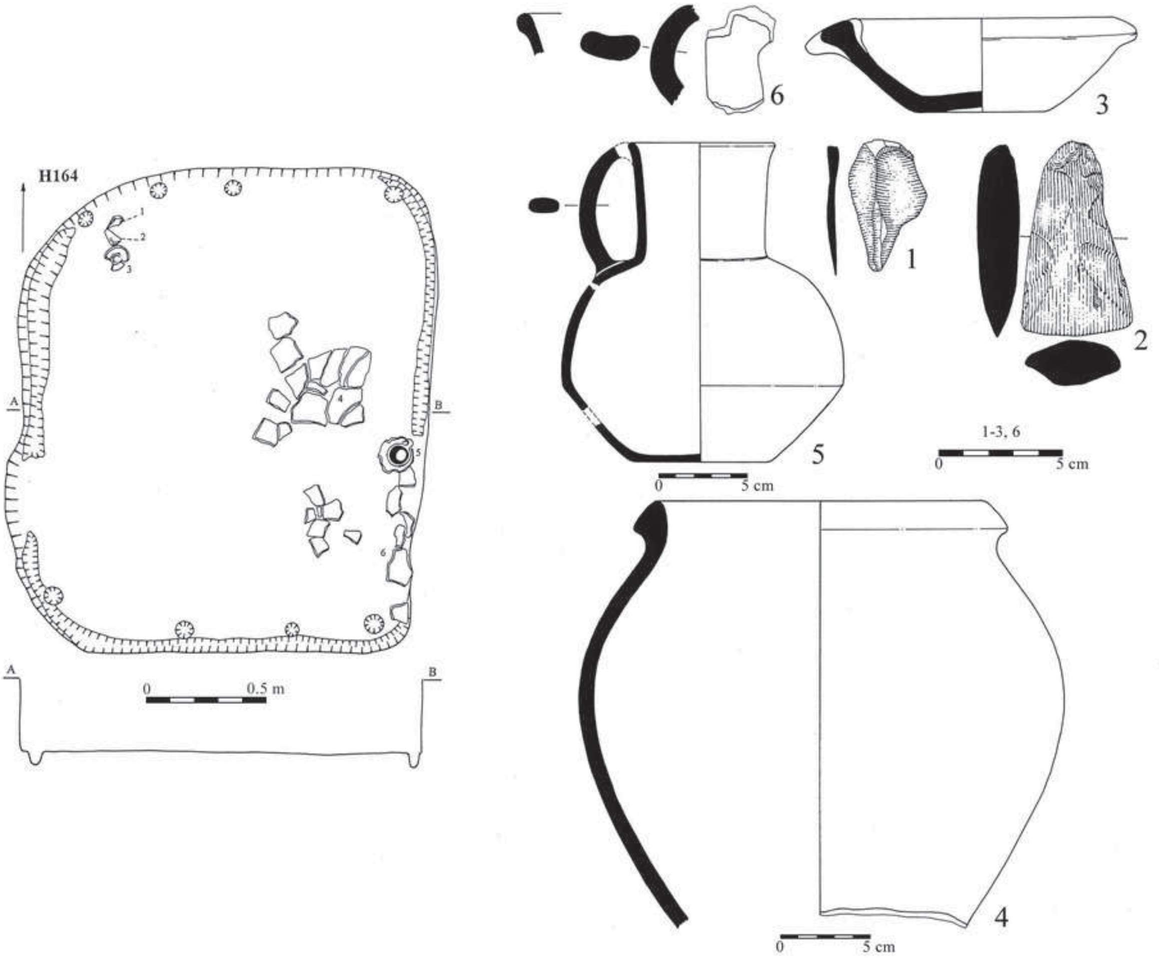

Fig. 1. Olomouc-Slavonín, Horní lán. Grave of Corded Ware Culture (H 164) with an internal wooden perimeter construction. Drawing by A. Pešková

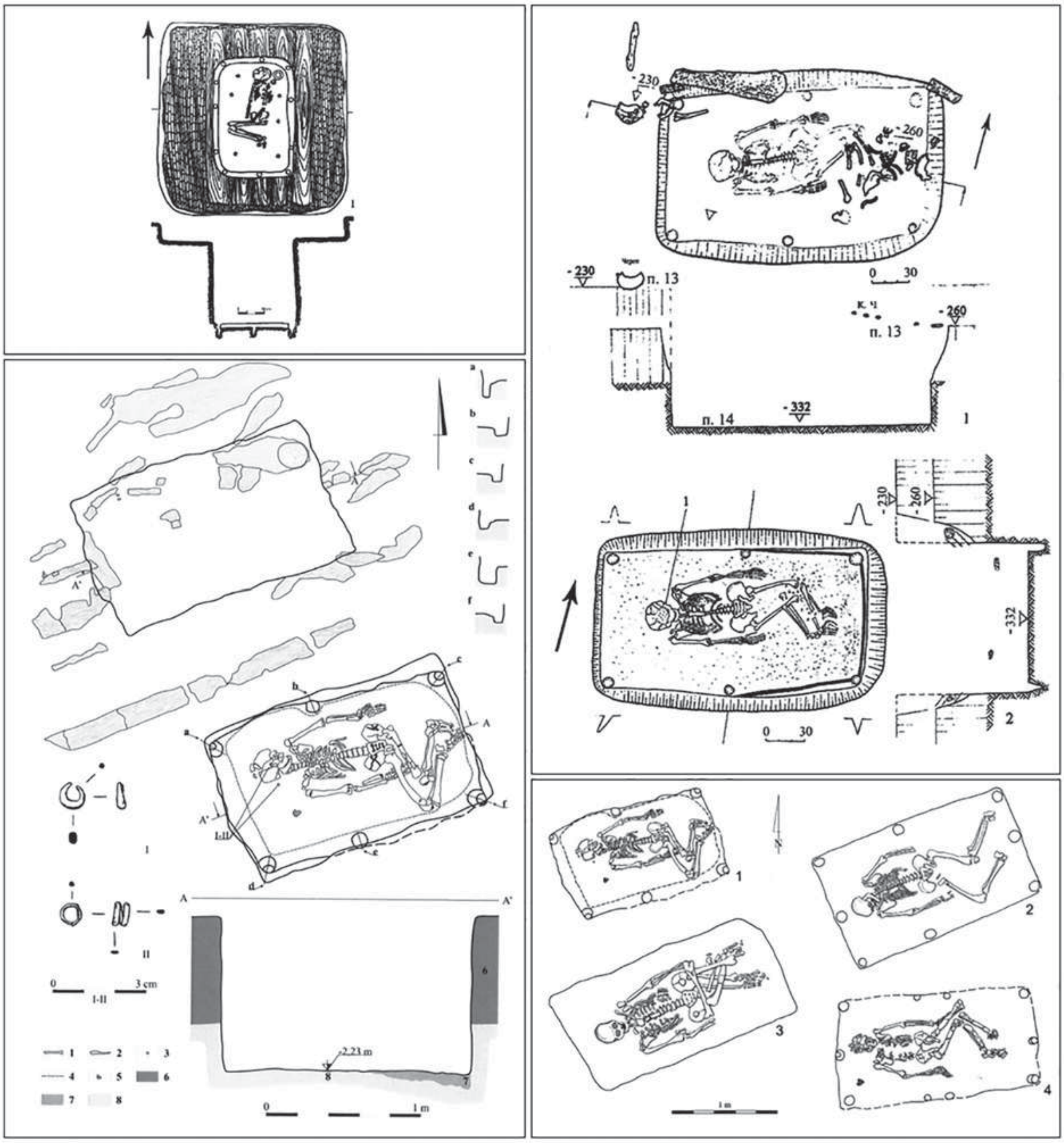

Fig. 2. Examples of internal post-built constructions in graves of Yamnaya Culture in the East European steppe region (after Agulnikov *2011;* Larina – Manzura – Chachey *2008;* Włodarczak *2017)*

dimensions with chambers, male burials in contracted position on the right side and E–W orientation, grave goods in the form of flint daggers and red ochre colouring (Heyd 2017, 354, Fig. 3).

The vast majority of MCWC grave pits have a simple form with flat bottom. The frequently occurring, strikingly dark fill has been explained by the infilling of the hollow space before the collapse of a wooden burial case or the ceiling (Neustupný – Smrž 1989, 326; Neustupný 2008, 131) with no traces of any additional construction. The description of an older find context in the grave from Vážany nad Litavou (Schirmeisen 1936, 13–14), which mentions four corner posts, a wooden ceiling with a thick layer of mouldered wood and three skeletons in non-anatomical position resting on this layer, confirms the existence of wooden burial cases. While the inner construction can be evidenced by circular postholes/stake holes in the corners of the grave pit (Boleradice, Brno-Lískovec, Podolí), the two longitudinal ruts or four oval slots in the bottom of the grave must be interpreted in a new way (see below). An example of inner construction with a combination of a perimeter groove and two opposite rows of postholes (Olomouc-Slavonín, Horní lán H 164) is unique so far. It can be reconstructed as a complete inner wood lining of a grave pit (*Fig. 1*), which has analogies in the Yamnaya and Catacomb cultures (*Fig. 2*; Häusler 1974, Taf. 32:3; Szmyt 2009, Fig. 6:B; Ivanova – Toshchev 2015, Fig. 18:8,12; 20:4; 22:2,3; Włodarczak 2017, Fig. 13; Koledin *et al.* 2020 and many others). Seen from a wider perspective, such constructions are associated with the so-called houses of the dead (*Totenhäuser* – true houses of the dead should exhibit traces of an external construction), which occur in our territory more frequently during the Early Bronze Age (Bátora 1999; Peška – Tajer 2007). The circular ditches around the graves might also represent an analogous feature. These structures are relatively frequently observed with tumuli in East Europe (Kaiser 2003, Taf. 10; 21; 24; Ivanova 2013, Fig. 3:1), but also e.g. in the Balkan-Carpathian region (Frînculeasa *et al.* 2019, Fig. 3; Koledin *et al.* 2020). We can find them so far only sporadically in MCWC in Moravia (Holubice VII, Babice u Šternberka), more frequently in Bohemia (6×). The frequency in BBC is exactly the opposite, with a culmination in the Csepel Group in Hungary (Endrödi 2013, Fig. 7, 9; Patay 2013; Czene 2017; Peška 2022).

Wagon burials?

The group of graves with two ruts or four longitudinal slots in the bottom, with a clear concentration in Central Moravia (*Figs. 3–4*), were so far interpreted as graves with inner construction (cf. Peška 2002; 2013, 117–119, obr. 72; 2017, 24; 2021). But it gradually turns out that these finds should be rather interpreted as wagon burials (!), of whom we know sufficient examples in the territory of Yamnaya and Catacomb cultures in the whole Black Sea region as far as the North Caucasus (over 250 graves in the Pontic-Caspian region: Piggott 1983; Reinhold *et al.* 2017; most recently Kaiser 2019, 23 ff.), with an "offshoot" in the western Black Sea region south of the Caucasus (Ananauri T. 3, Bedeni Culture, 1st half of 24th century BC: Makharadze 2016) and later e.g. in South Russia (Sintashta: Lichardus – Vladár 1996; Parzinger 2010; 2000–1800 BC). In the Late Funnel Beaker culture at the turn of the 4th–3rd millennia BC, traces of wagons were found in the cemetery of Vestrup in Northwest Jutland (Johanssen – Nielsen – Jensen 2016, Fig. 7a, 7b). The traces of a wagon under the mantle of a long barrow at Flintbek from the same cultural sphere in North Germany (Mischka 2011) are even older (ca. 3400 BC). The two animal burials from Profen (Central Germany; 3300–3000 BC: Friederich – Hoffmann 2013) are interpreted as the burial of a team of two draught animals with a wagon.

The difference here is that in the East European steppe region often directly the wooden components of wagons are preserved and a minimum of ruts (wheel slots), whereas in Moravia these wheel slots (*Fig. 5*) represent so far the only evidence of this type of burials. Another interesting fact is that in Moravia we find surprisingly identical analogies to these ruts much later, in the Hallstatt Period elite graves (Kos 2011; Kos – Přichystal 2013; Mírová – Golec 2018, 58–62; Mírová 2019, 70 ff.). Similar wheel slots are also found in the Hallstatt and La Tène Period elite graves in a wider European territory (Pare 1992; Lambot 2018), but these traces mostly belong to two-wheeled chariots. Previous calculations and reconstructions of types and dimensions of four-wheeled wagons, which were published in professional literature, instigated us to make an attempt to project a wagon model (Trialeti) into the ground-plans of our CWC grave pits. This attempt was (in almost all cases) surprisingly successful, which supports the idea mentioned above (*Fig. 6*).

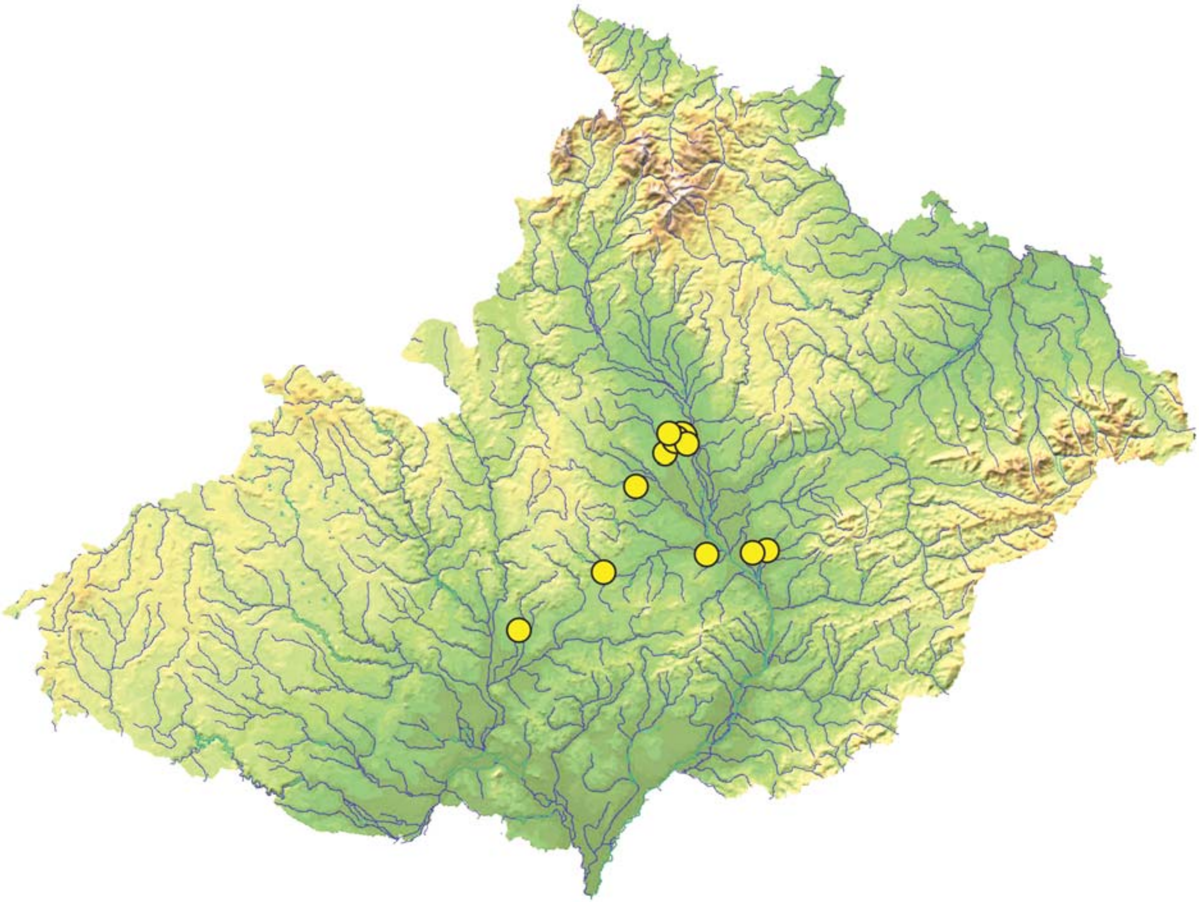

Fig. 3. Distribution map of graves with ruts/wheel slots in the MCWC in Moravia (map by P. Grenar)

The cross-section of these ruts/wheel slots (bowl-shaped, semi-circular) and taphonomy of the deceased do in no way contradict the hypothesis: just the opposite. We can take into consideration a hollow space as well as a “fall” of the human body from a minor height (the hull of a wagon) to the bottom of the grave pit (distance not larger than 0.5–0.7 m), anthropologists say. An exact evidence of the presence of wood in the ruts has been intensively sought (a new grave with wheel slots from Vyškov-Dědice, from which samples of the fill were taken for an analysis, unpublished). The absence of any wagon components (except the wheel slots) indicates an all-wood four-wheeled ceremonial wagon used for the burial of some selected individuals with no special social status (according to grave goods), similar to those that were used within the wider Black Sea region. However, the deposition of a deceased person on a wagon per se indicates a higher degree of social prestige (particularly well evidenced in the later Hallstat–La Tène Period). Because at that time we do not know any other wagon burials than those from the region north of the Black Sea and from Moravia, with a single exception of the Bulgarian site of Plachidol I T. I/Gr. 1 (Panayotov 1989, 95–100, Fig. 64–71), the confirmation of this hypothesis would provide another conclusive evidence of direct contacts between the two above-mentioned regions during the 3rd millennium BC and a strong argument to support the results of accomplished archaeogenetic analyses. The general absolute dating of Budzhak culture is mainly based on two phases (3340–3150 BC and 2890–2680 BC: Ivanova 2013, Fig. 23), of which particularly the later one is interesting to us.

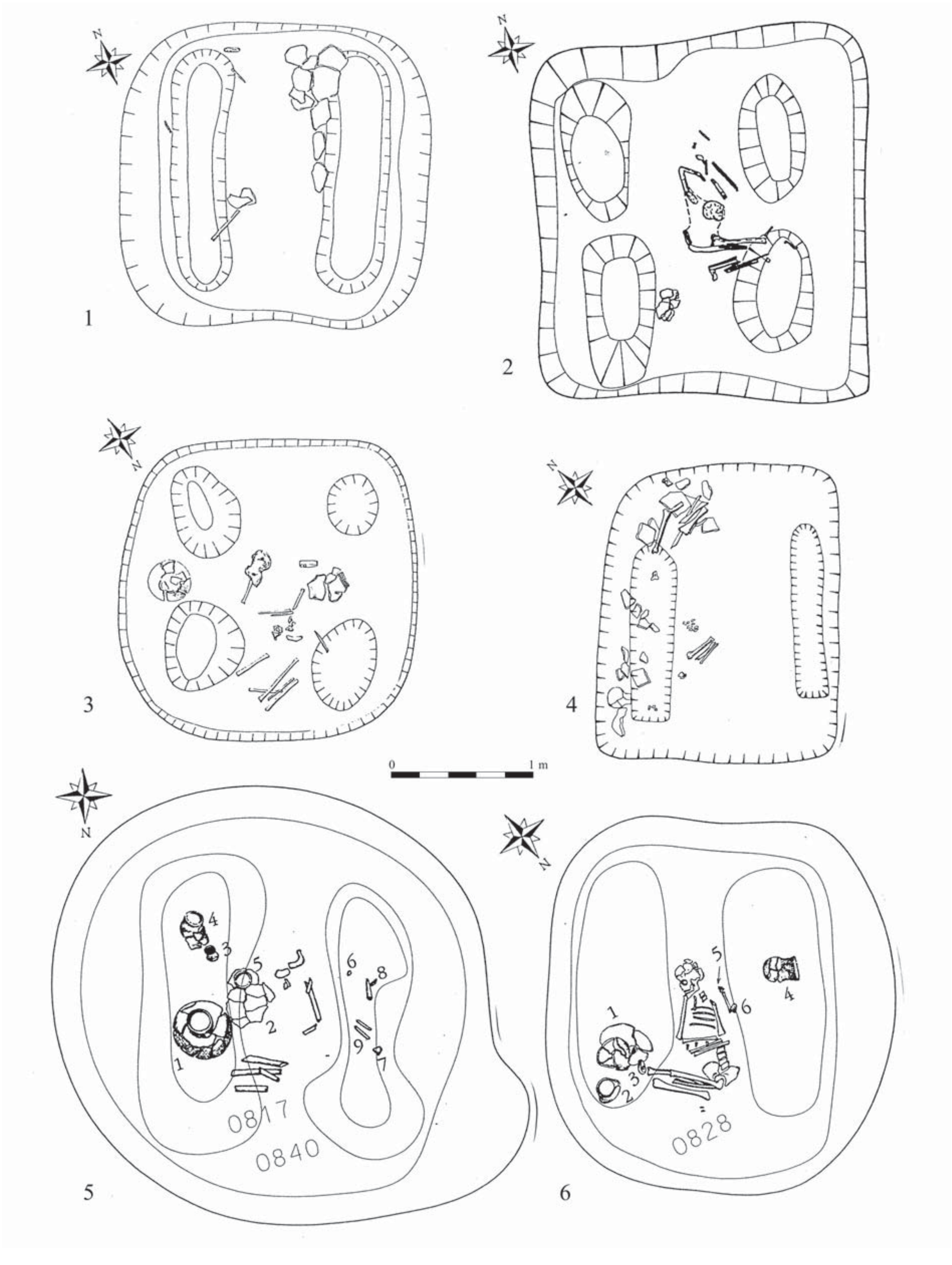

Fig. 4. Selection of MCWC graves with ruts in the bottom of the grave pit: 1. Olomouc-Nemilany 3, Gr. 4; 2. Olomouc-Nemilany 1, Gr. 50; 3. Olomouc-Slavonín 1, Gr. 19; 4. Bystročice, Gr. 1; 5. Olomouc-Nemilany 3, Gr. 18; 6. Olomouc-Nemilany 3, Gr. 28. Drawings by A. Pešková

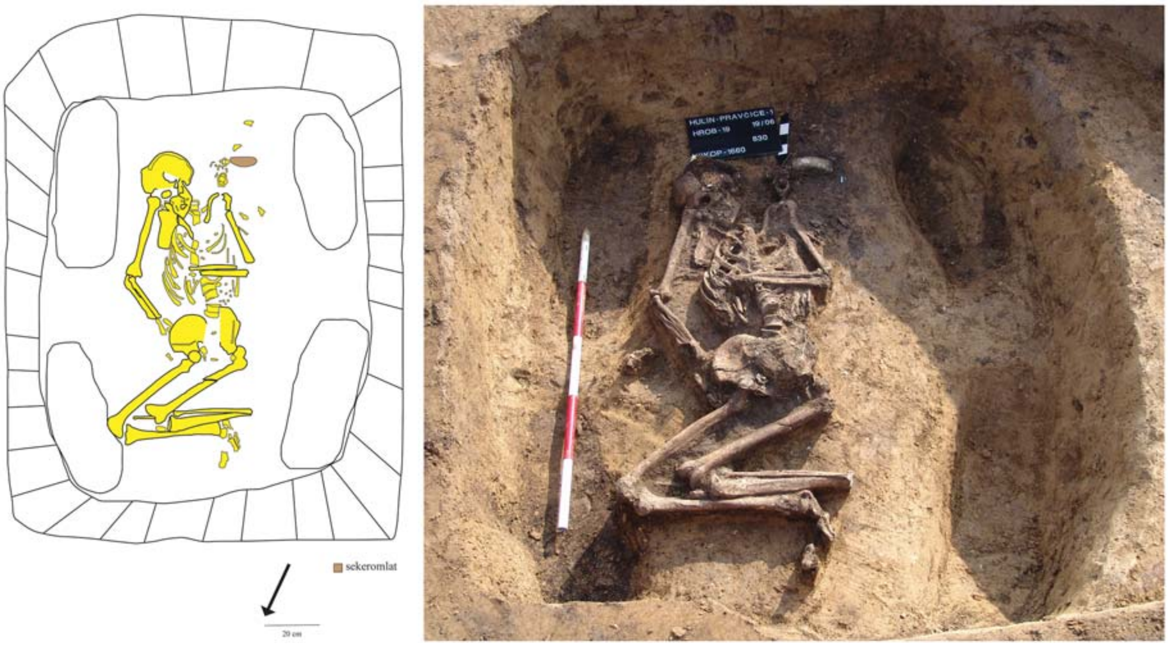

Fig. 5. Example of a grave with wheel slots; right-sided contracted burial (probably male) with a stone hammer-axe. Drawing by A. Pankowská and L. Šín, photo by M. Paulus

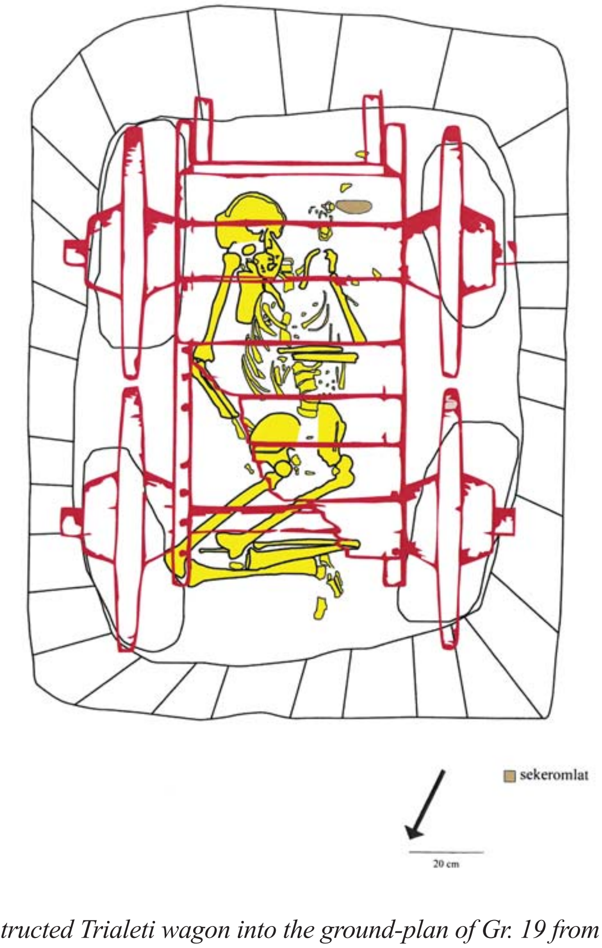

Fig. 6. Projection of a reconstructed Trialeti wagon into the ground-plan of Gr. 19 from Hulín-Pravčice 1 (P. Grenar)

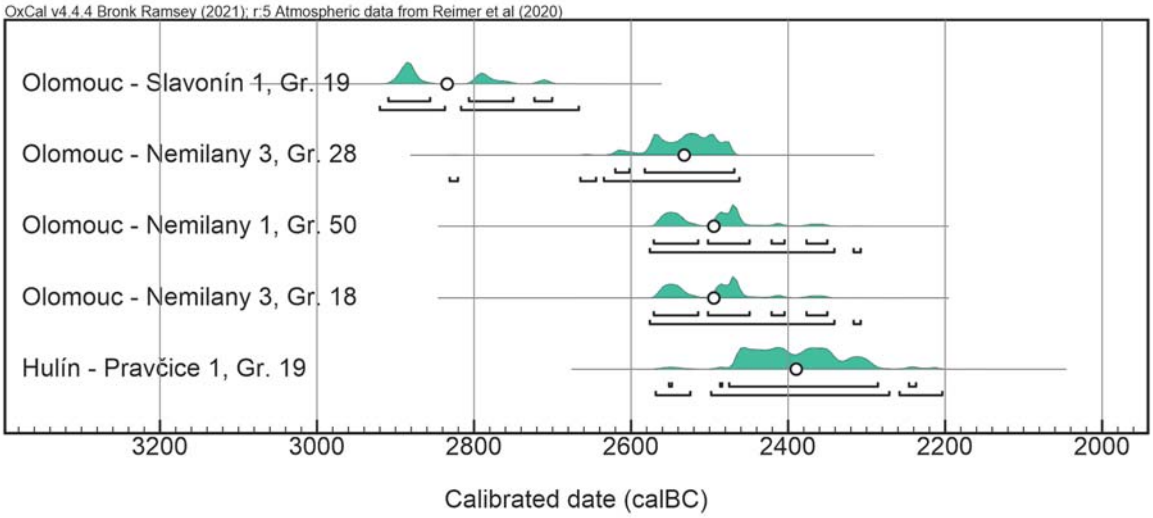

Fig. 7. Absolute dating (^{14}C) of MCWC graves with wagon burials in Moravia (graph by P. Grenar)

The dates acquired from CWC graves with ruts/wheel slots fall within the interval of 2910–2700, or 2580–2365 BC respectively, that is, generally to the time between 2800 and 2400 BC (*Fig. 7*).

Social stratification

Typical feature in most graves of Yamnaya and Catacomb cultures is the sporadic occurrence of funerary equipment, which seems to fade out with increasing distance from the crystallisation centre. This is particularly typical for graves of Yamnaya culture in the region east of the Black Sea, in the Carpathian Basin and in the Balkans. Seen purely from the perspective of funerary equipment, the situation with CWC is "better" because social differences are already well visible (Peška 2022). Besides richly furnished graves (male burial Letonice T. 6; female burial Marefy I, Gr. 1) related to the steppe region (the spectrum of copper artefacts in Letonice), there also are burials without grave goods (Peška 2013, 127), even though they are only a few in number. Among the richly furnished graves are also graves of craftsmen, more precisely metallurgists (Nechvalín, Tešetice, Velešovice and maybe also Hoštice-Heroltice: Peška 2022), which are particularly frequent in the territory of Bell Beaker culture (Peška 2016). A special category is represented by wagon burials, which do not count among the best equipped graves and their social or other significance must probably be sought elsewhere (maybe the fact of a wagon burial itself?). An illustrative example is a small cemetery at Vyškov-Dědice, where a grave with ruts/wheel slots (H 802) was equipped much more modestly (2 vessels, bone point and fragment of a quern-stone) than the neighbouring grave H 800 with pottery (2×), polished axe, two-edged copper dagger ("spatula blade" with analogies in the steppe region), copper awl, chipped stone industry, bone chisel and two bone points (unpublished).

Graves of craftsmen – metallurgists' graves

The origins of depositing metallurgical implements in graves of specialised craftsmen have been sought in the eastern parts of Europe in the area to the north and east of the Pontus (Bátora 2002), where this phenomenon has a much longer tradition (Maykop culture). From there, it may have been distributed as a part of the so-called Yamnaya package (Harrison – Heyd 2007) to Central Europe in the 2nd–3rd quarter of the 3rd millennium BC, still before its adoption by BBC (Fitzpatrick 2011, 213, 217). This is in no contradiction to the rich evidence of metallurgy in the territory of Vučedol culture (cf. Durman

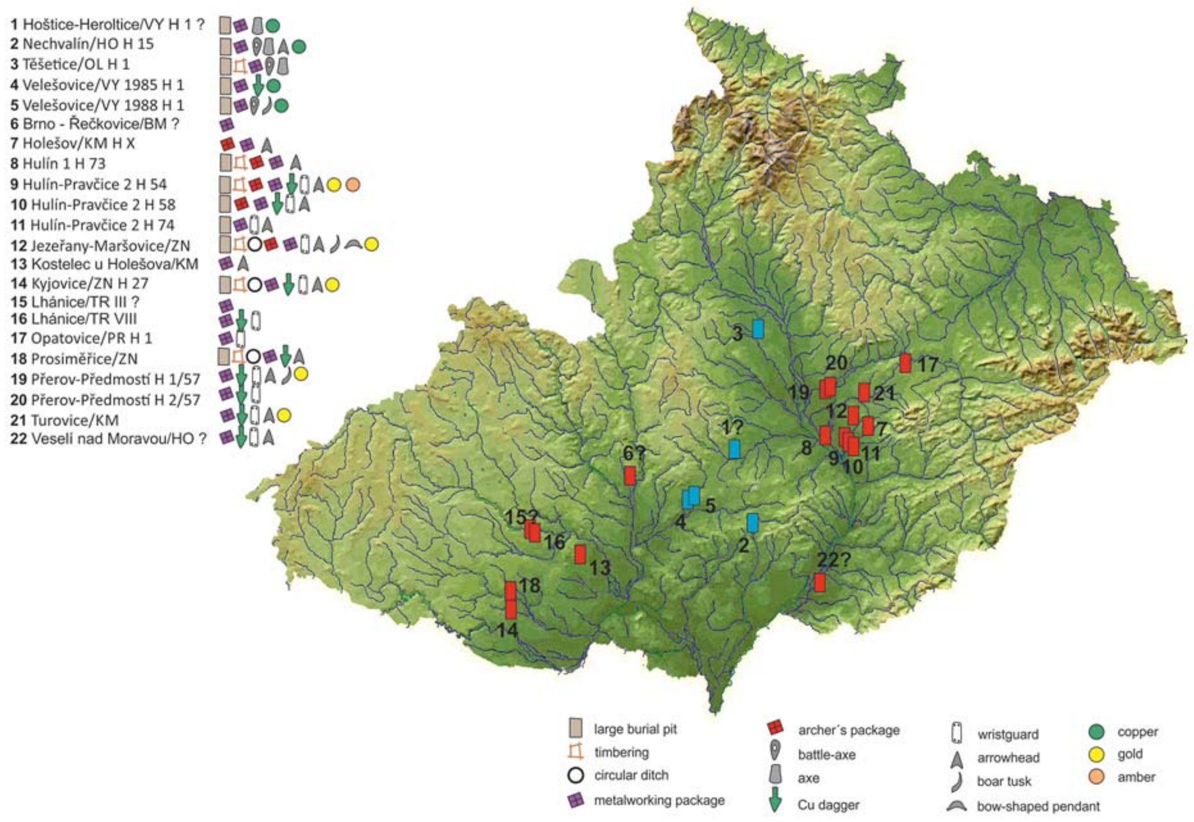

Fig. 8. Map of metallurgists' graves in the MCWC and BBC in Moravia (map by P. Grenar)

1988, 32–38, 58–60, cat. 203–208, 210, 220; Balen 2005, Sl. 39–40, Tabla 59–61), from where we know the oldest grave of a metallurgist (chaser) under the burial mound Velika Gruda with absolute dates 3044–2879 BC (Primas 1996, 48–52), or 3138–2859 BC respectively (new OxCal 4.3 calibration). In East Europe, we can mostly find graves of metal founders containing clay nozzles and casting moulds, and a combination with metalsmithing equipment is also common. Much more frequent with Central Europe, on the other hand, are hammers, anvils, boar tusks and various grindstones, i.e. implements for cold metalsmithing. Unlike the Pontic region and the East European tradition, where both types of metallurgy (metal founding, metalsmithing) occur parallel to one another, in Moravia we can observe a thorough separation of founding and chasing, both in the Beaker cultures and in the Early Bronze Age.

The MCWC graves from this category (*Fig. 8*) represent well-equipped, but not the richest, male burials or symbolical graves with male-specific equipment (Nechvalín, 2× Velešovice). Metallurgical equipment is limited to only solitary pieces – probably anvils (Těšetice, Nechvalín). The metalsmithing toolkit in grave H 1 from Velešovice I 1985 is composed of 3 pieces of stone – local sandstone, siltstone and Culmian greywacke – most probably in a functional combination of 2 anvils and 1 hammer (*Fig. 9*; Čižmář – Geisler 1998, Tab. 34:20–22). Interpretation of a male burial from Hoštice-Heroltice (Šebela 1999, 62–64, Pl. 21–23), from which a total of 3 polished axes (with blow marks) and a whetstone are known, is not clear. We cannot draw any definitive conclusions until a microscopic analysis is made, but the high amount of chipped stone industry among the grave goods enables to classify this grave at least as a craftsman's burial. This context finds an analogy in a (male) grave from Želešice (Šebela 1999, 173–174, Pl. 122), which corresponds well with the occurrence of craftsmen's burials in the Black Sea region (cf. Bátora 2002; 2006; Bertemes 2004; 2010; Harrison – Heyd 2007; Kaiser 2019).

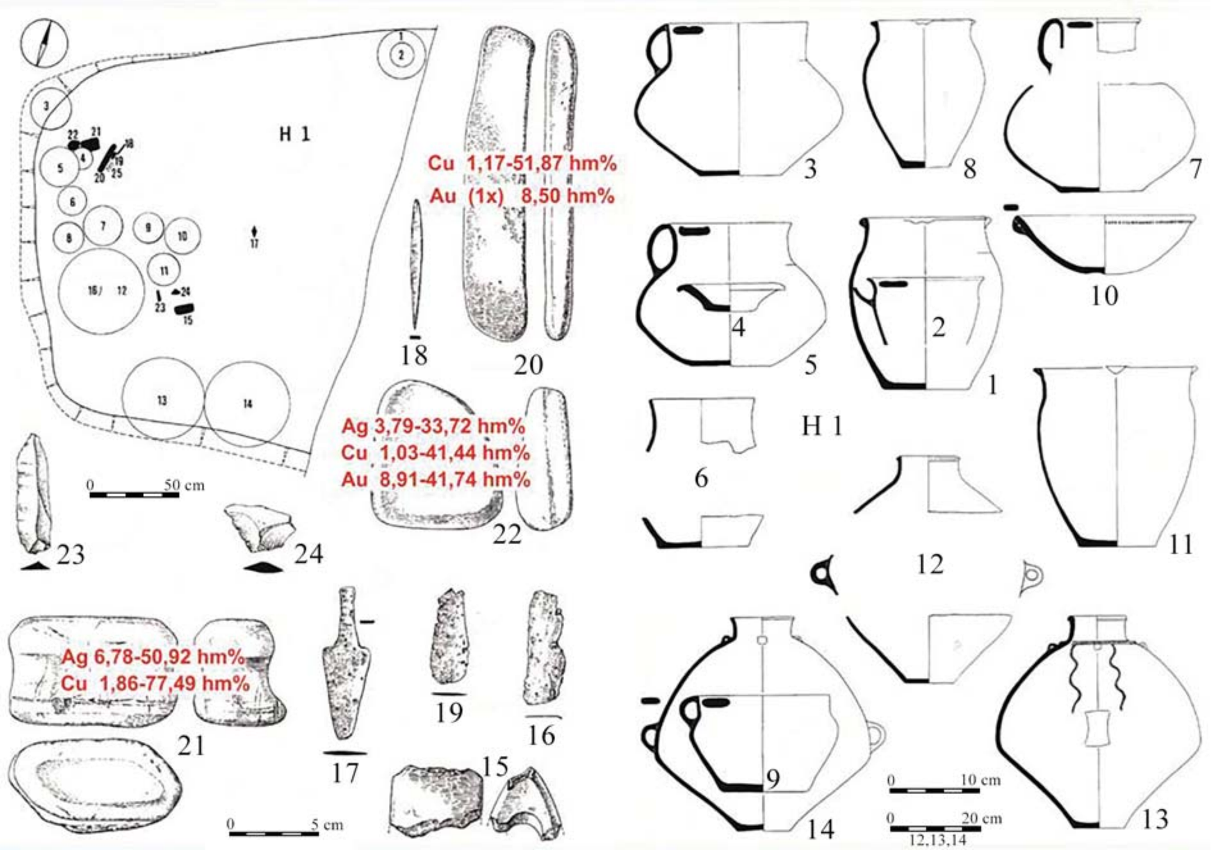

Fig. 9. Velešovice I 1985, H1 – a metallurgist's grave, containing among other things also a copper tanged dagger of eastern type, with measurement results of SEM analysis of the surface of stones that were part of the metallurgical toolkit (after Peška 2021)

Hoards

Despite the unclarified beginning of occurrence of a new type of heavy implements (single-blade axes/shaft-hole axes: most recently Dani – Szeverényi 2021), whose origin reaches back to the 2nd half of the 5th millennium BC (Iran, Mesopotamia), we currently suppose that the technological knowledge of these different forms of tools has penetrated from the Caucasus through the South Russian and Ukrainian steppes to the Balkans and the Carpathian Basin (Benešová 1956, 243; Bátora 2003; Dobeš *et al.* 2019, 30). In the region north of the Caucasus, they appeared (maybe under the Mesopotamian-Iranian influence) in the Maykop culture in the mid-4th millennium BC and then also in graves of the Post-Mariupol culture, Kemi-Oba culture and subsequently also Yamnaya culture. The last-mentioned culture might have mediated their transfer to the Carpathian Basin, where plenty of them occur in hoards (Corbasca, Fajsz, Dunakömlőd, etc.) with a concentration in Transylvania (Vulpe 1970, Abb. 1, Taf. 49), where they are rather ascribed to local cultures (Makó/Kosihy-Čaka). Similarly, in Moravia we associate the hoards from Brno-Líšeň, Vevčice and most recently Stavenice with Jevišovice culture (Peška 2013, 38, obr. 17; Dobeš *et al.* 2019, 30–31, obr. 4). At least a chisel with pyramidal neck from Brno-Líšeň exhibits some relations to the hoard of Fajsz (Kalicz 1968, Taf. I:16,17), but mainly to graves of Maykop culture in the North Caucasus (Novosvobodnaya-Tsarskaya, Klady, Maykop: Rezepkin 2000, tab. 63:5,7; Bátora 2006, 29–31, obr. 13–14). The chronological position of occurrence of the new tools at the turn of the 4th–3rd millennia BC or immediately below this boundary remains unchanged in our territory, their cultural identity is still to be discussed. From the find contexts of MCWC we do not yet know any metal hoards and this type of axes was not laid into MCWC graves, unlike the male graves of Maykop culture (late Novosvobodnetskaya phase), Kemi-Oba culture, Yamnaya and Catacomb cultures, but also Middle Dnieper culture and Fatyanovo or Balanovo cultures (Bátora 2006, 13–54) with a wide interval of absolute dating 3500–3100 BC (Maykop) or 2910–2770/2496 BC (Yamnaya). Shaft-hole axes of the Early Bronze Age cultures are younger.

Technological sphere

Caucasian metallurgy

The revival of metallurgy and technological innovations after a decline at the time of the Baden Complex, which included a different method of smelting and casting into two-part moulds, dominant processing of arsenic copper and a higher amount of gold and silver objects, are summarised by Sherratt (1997; 2003; 2004) under an umbrella term "Caucasian metallurgy" within his "Secondary Products Revolution". Numerous examples of local production can be followed up in the territory of Vučedol culture, but also in the Post-Baden local cultures (Makó/Kosihy-Čaka, Somogyvár-Vinkovci) in the Carpathian Basin and in the Balkans (Vučedol, Vinkovci-Tržnica, Velika Gruda, Zók-Várhegy, Üllő, Veľký Meder, Nevidzany, Tesárske Mlyňany), where they form a distinct civilisation horizon associated with this metallurgy that represents a part of the Yamnaya package (Peška 2013, 70–71).

With the exception of the above-mentioned metallurgists' graves, the problem of metallurgy in MCWC is in fact irresolvable due to absence (with but a few exceptions) of metal analyses and means of production. The new design of weapons/tools (shaft-hole axes) must be rather associated with Jevišovice culture. The form of a few specimens of tanged daggers, metrically different from tanged daggers of Bell Beaker culture (Velešovice, Kroužek: *Figs. 9–10*), resemble most the products of Yamnaya and Catacomb cultures in the North Pontic region, or as far as in Ural (Häusler 1974, Tag. 2:7; 4:14,15; 7:7; 8:7 and other; 1976, Taf. 10:8; 37:7,17; 38:4; 43:4; 44:6; Shishlina 2008, Fig. 25:1; 33:11; 51:5; 68:4,5; 91:2; Morgunova 2011, Fig. 2:6; 4:4,11), including the East Balkans (Băjenaru – Popescu 2012, Fig. 6:5–7; 7:1,2), but also e.g. the site of Tell Khaznah I in what is now Syria (Bátora 2006, obr. 6). The westernmost occurrence of such a dagger is known from an inhumation grave at Bleckendorf in Central Germany (Behrens 1952). Similar artefacts with a shorter grip tang and a longer and more slender blade (sometimes with a central rib) are known from the Ljubljana Marshes (Ig: Korošec – Korošec 1969, T. 105:8,9,11; Zimmermann 2007 "Eurasian" Type BB2b). Similar metrical characteristics were also detected with e.g. a smaller two-edged knife from the burial mound Velika Gruda on the Montenegro coast of the Adriatic Sea (Primas 1996, Abb. 7.1:M3), but also from the Vučedol site (Schmidt 1945, Taf. 48:19, 20). The form of the two last-mentioned specimens then resembles a less frequent new type of a dagger or knife (two edges, absence of pointed blade: earlier referred to as "spatula blade" from Letonice T. 6, Vyškov-Dědice) with analogies in the same territory (Häusler 1976, Taf. 20:15,16; 24:6; 27:26; Agulnikov 2008, Rys. 3:8; Ivanova 2012b, Rys. 6:2; Băjenaru – Popescu 2012, Fig. 6:8,9). The "razor" from Morkůvky (Šebela 1999, Pl. 60:2) with a curved pointed blade is completely unique in the milieu of Corded Ware Culture and it has only a few parallels in the Yamnaya culture in a remote area between the Volga River and Ural (Polin – Chernykh 2009, Rys. 1:4; Morgunova *et al.* 2010; Morgunova 2011, Fig. 5:6). Some East European parallels might be also identified with several awls. Direct connection is to be confirmed by spectral analyses in the future.

The blades of sheet-metal knives seem to be of Central European origin so far: it is indicated by their absence in East Europe, concentration in Moravia and Lower Austria, and by isolated finds in SW Slovakia (Šaľa) or Upper Bavaria (Kösching) (Benkovsky-Pivovarová 2005; Kolář *et al.* 2011, 110, obr. 48:7; 49; Peška 2013, 134, 137; Kolář 2018, 163, Fig. 137:19). We are not really convinced of their function, although Šebela (1986, 135) noticed a different patina in a stripe along the spine of the specimens from Vážany nad Litavou and Brno I and hypothesized that the tool might have been set into a grip from organic material.

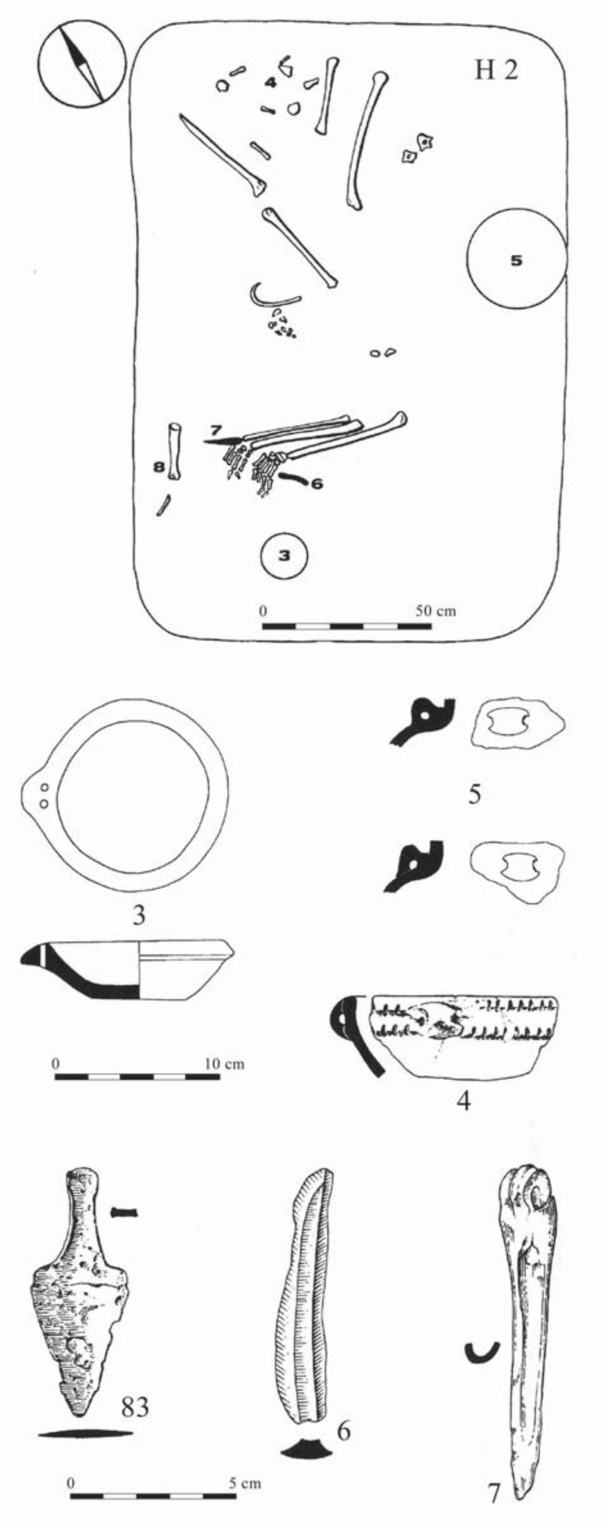

Fig. 10. Kroužek 1985, Gr. 2 – an MCWC grave with a tanged dagger of eastern type (after Čižmář – Geisler 1998)

In MCWC, we do not find spiral hair rings from a massive silver, gold, electrum or copper wire, which are widespread east of our territory. Their occurrence seems to end in the burial mound at Neusiedl am See (Ruttkay 2002; 2003). The coiled/spiral-shaped hair ornaments with one flat-hammered end, which are very frequent in MCWC as well as in Lower Austria, Bohemia, Poland and partly also in Central Germany, might be connected with steppe regions. The theory of their East European origin has been a little relativised by the occurrence of typologically absolutely identical specimens in the megalithic tombs of BBC on the Iberian Peninsula and in Southern France (Peška 2004a, 104–105 ff.), which are related to the early phase of BBC in the given territory. On the other hand, the theory is supported by the fact that the finds in the Pontic region are older than the Late Trypillia (Usatovo) and Yamnaya cultures (Zbenovich 1974, Rys. 26:10–12; Dergachev – Manzura 1991, Rys. 47:11; 68:6–8; Manzura 1993, Fig. 6:9,10; Agulnikov 2008; Rys. 3:10; Häusler 1976, Taf. 31:4; Dergachev 1986, Rys. 13:3–6; 18:11; Frînculeasa 2007, Pl. 3:M1; 4:3; Larina – Manzura – Chachey 2008, Rys. 9:4; Chachey – Popovich 2010, Rys. 4:2,4; 11:3; Ivanova 2013, Rys. 21, 22; Frînculeasa *et al.* 2013, Fig. 9; Pl. 3:2; 16:7; Klochko 2017, Fig. 10:2) and some of them only have an indicative flattening of one of their ends. This also applies to finds from the territory of East Balkans (Alexandrov 2017, Fig. 8; Frînculeasa 2019, Pl. 8:2; 2020, Pl. 16:3; Frînculeasa *et al.* 2019, Pl. VII). Flattening of both ends, which only occurs with specimens coiled from a massive double wire, was detected in a cemetery of Yamnaya culture in East Hungary (Dani –

Nepper 2006, Fig. 4:2,3; 5:3,4; Gerling *et al.* 2012, Fig. 5: graves 4 and 7–7a) and other indications can be observed with finds from North Bulgaria (Alexandrov 2009, Fig. 1). A link between them might be the simple spirals with flat-hammered end that occur in the CWC in Lesser Poland (e.g. Włodarczak 2006, Tabl. LXXXVI:5,6).

Simple wire neck rings in Corded Ware graves (besides Moravia also Lesser Poland, Bohemia, less frequently Lower Austria) have their predecessors already in the time of classical and Late Baden Culture in Lower Austria and in the Spiš region (Baden-Königshöhle, Leobersdorf, Lichtenwörth, Veľká Lomnica) (here the type with loop ends: Novotná 1981; 1984; 2006). Reference is made to specimens from the Carpathian Basin, which already occurred since the beginning of the Eneolithic (Polgár Complex – Bodrogkeresztúr phase: grave from Decea Mureşului), and to those from the Horodnica hoard in the Ukraine (similar dating: Sulimirski 1961), which are surprisingly older than the specimens in Eastern Mediterranean (Ras Shamra, Byblos – hoard). These neck rings occur in the Suvorovo-Novodanilovka Culture (Giurgiuleşti I, Gr. 1: Dergachev 2002, Taf. 10: A2), in the Yamnaya culture, including the Crimea (Kemi-Oba culture: Häusler 1976, Taf. 34:12; 44:15), and in pre-Yamnaya graves in Romania (Frînculeasa – Preda – Heyd 2015, Pl. 9:2). In our territory, they continue until the Epi-Corded phase of the Bronze Age (Bátora 2000, 321–322; Peška 2013, 138).

Considering the extent of this contribution, in the following text we will only briefly describe the relations of MCWC material to the East European territory.

Economic sphere

The complicated problem of horse domestication, including a theory that horses originate from a single place, is not yet satisfactorily solved. One of the domestication hypotheses refers to East European and Asian steppes (Black Sea region and Kazakhstan) in 3500–2500 BC, whereas the second hypothesis is based on the assumption that we do not know any direct evidence of domestication until 3000 BC. The first cases of domestication are said to have appeared in the territory of Sintashta-Petrovka Culture in the Ural Steppes (wagon burials) around 2000 BC. Later examples are known from the Near East, Egypt, China, Greece and Central Europe (most recently Mírová 2019, 172). It is true that we do not have any direct proof that horses were used around 3000 BC (maybe except the horse bones on individual sites and the finds of bone toggles), but older indirect evidence (models of wheels and wagons, finds of wooden wheels since the Boleráz Group and osteological remains since the classical Baden Culture) makes us consider whether the wagons and carts of that time were pulled only by bovine animals or whether horse also played some role.

A separate issue, which is not really easy to grasp, is the supposed predominant pastoral economy associated with breeding of large herds, transhumance and practical use of bred animals (sheep for wool). This type of economy is well applicable to the eastern steppe regions. The increasing number of detected MCWC settlement sites (Peška – Fojtík – Daňhel 2021), together with several grave goods related to agriculture (blades with gloss, grinding plates, millet finds) in Corded Ware graves might indicate at least a mixed pastoral/agricultural economy.

As already mentioned above, wagon burials must have demanded high production and organisation skills, but the gender-specificity or amount of grave goods cannot be considered an indisputable social attribute. The full impact of this symbol should probably be sought in some other sphere.

Innovations in material culture

The change of hairstyle (and fashion?) is indicated by the use of massive simple (max. up to 2.0 coils) gold, silver or electrum spiral hair rings (*Lockenringe*) outside the territory of CWC, with an origin in East Europe. In the territory of CWC, multi-coil helical/spiral-shaped hair rings with one flat-hammered end are preferred, with remarkably identical analogies in West Europe (Peška 2004b). Similarly, the bone toggles (*Knochenknebel*), which are still missing in Moravia, became part of the funerary equipment of Corded Ware graves as far as in Poland and Lower Austria.

The problem of the origin of bone/antler/mother-of-pearl/amber or sheet-metal solar discs, which occur in the CWC (and in the related cultures in the Baltic Sea region and in the area of lacustrine villages in West Switzerland) as well as in graves of the Globular Amphora culture (GAC), Złota culture and Late Catacomb culture (a variant made from sheet metal), must still remain open, although some indications of transfer from the east to the west are known (Kaiser 2019, 260–270). In our territory, this category of artefacts is represented by the disc from Hřivice (Moucha 1981) and by a more recent grave find with problematic absolute dating from Olomouc-Nemilany 4 (Kalábek – Peška 2006; Králík *et al.* 2006; Peška 2011; 2013, 148–149, obr. 99, 100). It seems that the discs that were found outside the North Pontic region were decorated with a radial (solar) rather than with a cross-shaped motif. However, the finds of GAC and CWC in the territory of Poland, Denmark, Bohemia or Switzerland indicate a more general predominance of this decorative pattern (Peška 2013, obr. 102).

The cord-ornamented pottery is a wide-reaching phenomenon because it appears in a vast territory during multiple chronological horizons, e.g. from the 2nd half of the 5th millennium BC (Sredny Stog II), from the 1st half of the 4th millennium BC (Cernavoda I), from the 2nd half of the 4th millennium BC (Baden/Coţofeni), or in various chronological horizons of Southeast Europe respectively (Roman 1974; Roman – Dodd-Oprițescu – János 1992; Bertemes 1993; 1998; Kotova 2010). So, it certainly does not represent an original part of the "Yamnaya package" (Kaiser 2019, 259–260) but counts among characteristic attributes of steppe cultures, among them also the Yamnaya culture. Some researchers associate the cord-imprinted décor especially with the last-mentioned Yamnaya culture during the Final Eneolithic (Vladár – Wiedermann 2020). This type of decoration certainly accompanied the origins of Corded Ware. In our territory, it already occurred earlier than with CWC, but still within the chronological range of the intrusion of Yamnaya culture (Jevišovice, GAC, Late Baden).

The cross-footed bowls, most of them decorated on both inner and outer surface, also appear in a vast territory from the North Caucasus, or from the Middle and Upper Don, to Central Europe (Carpathian Basin, Western Balkans). They have a strong representation in Vučedol culture and Ljubljana Marshes, with some differences between the Vučedol and Yamnaya bowls, so that sometimes an autochthonous development has been considered (Kaiser 2019, 255–257). It is to remark that these bowls have no successor in the Yamnaya culture (leaving aside the East European censers, which are mainly widespread in the Catacomb culture). In our territory, we can find them in the whole Late Eneolithic Cultural Complex, where they are referred to as Ljubljana bowls (Cham, Řivnáč, Jevišovice, Makó/Kosihy-Čaka, Somogyvár-Vinkovci). The cross-footed bowls, similarly as jugs (vessels) with an asymmetrical handle, can be classed among contact finds, which interconnect geographically and culturally different regions within a certain chronological horizon.

Clay funnels so far occur outside the proper CWC e.g. in the context of Jevišovice culture and GAC (Peška – Vrána 2017, 60–61, obr. 8:3; 10), but also in Somogyvár-Vinkovci and Vučedol (2 specimens from a burial chamber) or in the Kostolac culture from Sarvaš (Balen 2005, 49, Cat. Nos. 187–193; Pl. 50:187–190; 51:191–193) with convincing parallels in Yamnaya and Catacomb cultures of the East European Steppes to as far as Kalmykia (Häusler 1974, Taf. 11:17; 17:15; 24:18; 28:18; Shishlina

2001, 24–26, Fig. 5; Shishlina – Tsutskin – Firsov 2001, Fig. 8; 12:1). A non-discussed problem that remains here is the technique of broom strokes (broom finish) applied to the surface of ceramic vessels.

The category of contact finds occurring in CWC (outside of Moravia) with clear analogies in the North Pontic-Caucasian region also comprises crook/hammer-headed bone pins (Kaiser 2019, 260–262; Gessner 2005; Mansfeld 2005), bone tubes (game calls?) and the so-called pan flutes (Häusler 1974, Taf. 7:6; 19:4; 21:3; Wróbel 1985, Rys. 3; Bátora – Staššíková-Štukovská 1993; Shishlina 2008, Fig. 87:9; 90:4,7; Larina – Manzura – Chachey 2008, Rys. 31:2–5; Ivanova 2012b, Rys. 6:5; Bátora 1999, 36–39; 2006, 171–175; 2009, 246–247; Šmíd 2000; Włodarczak 2006, Tabl. XXXII:6; LXIX:8), whose occurrence continues to the Epi-Corded Carpathian Cultural Complex in the Early Bronze Age and fades out at its end. A little more complicated is the case with necklaces from animal teeth or composite necklaces that occur with various intensity in both of the studied regions, so that we are not sure whether or not they influenced one another.

The second fundamental component of material culture in the MCWC is its so-called local pottery with closest analogies in the south and southeast (Western Balkans, Carpathian Basin), which was already accentuated by Ondráček (1965). The local pottery has partly evolved from domestic forms but, since recently, several forms are considered of East European origin (amphorae with raised relief decoration etc.: Ivanova 2012b, Rys. 4,5; 2013, Rys. 2, 6, 8, 15–17). The occurrence of so-called Schönfeld-type bowls is to be connected with western territories, whereas the single-edged copper blades (knives) are most probably of local and regional origin (Moravia, Lower Austria). Southern origin (Ljubljana Marshes) might be supposed with bone belt-hooks of type Ig and their imitations (Brno-Veveří Street: Šebela 1999, Pl. 3:1). The all-metal hammer-axe of type Eschollbrücken from Lužice u Hodonína (Kibbert 1980; Maran 2008; Kerig 2010) is thought to be of western origin.

When we follow up steppe influences in the material content of MCWC, or CWC in general, we can observe a certain degree of concentration or common occurrence of these artefacts or phenomena in grave complexes: e.g. wagon and "spatula blade" in Vyškov-Dědice (unpublished), "spatula blade", awl and pottery in Letonice, tumulus 6 (Šebela 1999, Pl. 43–47), Velešovice I 1985, H 1 (Čižmář – Geisler 1998, Tab. 34, 35), etc. Another parallel might be the repeated occurrence of an analogous funerary equipment in the two studied regions: pottery – pin – awl – knife/dagger (Bleckendorf – Letonice – Vyškov-Dědice – Taraclia: e.g. Ivanova 2012a, Rys. 6.95:6).

The analysis of the MCWC material culture has identified a wide spectrum of East European influences. This finding might be connected to a considerable extent with the internal development of the culture itself, but also with intrusion of steppe elements (Yamnaya culture) from the eastern territories towards the west, which is also reflected in the genome of contemporaneous and subsequent populations (most recently Haak – Krause 2020).

Features within the sphere of Corded Ware culture, which with a certain degree of probability can relate to East European territory:

- the phenomenon of burial mounds (the original concept comes neither from Central nor from East Europe; the problem of continuity?)
- burials in supine position of the upper body with contracted lower extremities lying on the right or left side (*Rückenhocker*), but the burial rites otherwise have their own specifics
- rhombic position of lower extremities (so far only outside of MCWC)
- internal wooden constructions in graves – houses of the dead?
- ruts/wheel slots in the bottom of graves – probably wagon burials
- the custom of scattering ochre over the skeletons or laying ochre lumps into graves is older (Tiszapolgár, Bodrogkeresztúr, Boleráz, Baden) and, unlike the western Yamnaya region, it has not been applied to CWC graves

- one part of ceramic production (cord-ornamented ware, asymmetrical handles on vessels, clay funnels, raised relief decoration, broom finish?)
- stone hammer-axes and maces
- innovations in metallurgy
- graves of craftsmen, more precisely metallurgists
- one part of metallurgical production (shaft-hole axes, tanged daggers, a new type of daggers, "razor", neck rings)
- change of hairstyle fashion (ideology of helical/spiral-shaped hair rings – *Lockenringe*)
- ornamented solar discs?
- application of boar tusks: at the skull, headband, headdress? (unclear evidence in MCWC)
- crook/hammer-headed bone pins
- bone tubes (game calls)?
- pan flute
- faience beads (not yet in MCWC, in our territory later in the Early Bronze Age)

Conclusions

The presence of steppe nomadic groups in Central Europe was identified to have taken place in several waves. The oldest wave dates back to the turn of Tiszapolgár and Bodrogkeresztúr cultures in the Early Eneolithic. This wave was associated with a masculine and hierarchical society with relations to Varna Culture, rich raw material sources in the SE Balkans and tumulus cultures in the North Pontic region (Suvorovo-Novodanilovka). The second wave is associated with the so-called Pre-Yamnaya culture and, in the Carpathian Basin, with Late Bodrogkeresztúr culture, Lažňany-Hunyadihalom Group, Boleráz and Cernavoda II. The third wave is related to Early Yamnaya culture (at the level of Baden/Coţofeni II). In the course of further development, people of Yamnaya culture are even thought to have induced the collapse of the Baden unity and to have instigated the emergence of the Late Eneolithic Cultural Complex (Post-Baden). The autochthonous population in Middle and East Slovakia responded to this situation with the build-up of Late Baden hilltop settlements.

In Moravia, immediately before or during the Early MCWC, we can follow up an intrusion into the sphere of Late Jevišovice culture (Kroměříž-Miňůvky: *Figs. 11–12*), maybe through the Livezile Group (unless the people of this group in fact represent a local Yamnaya variant), whose impact reaches as far as into Central Bohemia (pottery from Kutná Hora-Denemark: Zápotocký – Zápotocká 2008, Tab. 34:1; 78:2; Peška – Tajer 2006; 2009; Peška 2011) or even into Central Germany (the above-mentioned graves at Bleckendorf and Profen). As we convincingly demonstrated, the MCWC exhibits close relations to East European regions, more precisely to Yamnaya and Catacomb cultures between the North Pontic region and the Caspian Sea. They are strongly expressed both in the burial rites and in material culture, technologies, but also in the ideological sphere and the economic-social base (most probably a mixed pastoral-agricultural economy). The tested "Yamnaya package" has not been adopted without exceptions (anthropomorphic stelae, ochre, bone toggles), but it had a sufficiently strong influence on the formation of later so-called local phases of MCWC. A significant phenomenon, identified recently in Moravia, is represented by the wagon burials, which are known (with one exception – Plachidol) solely from the Pontic-Caucasian region. They represent another clear direct evidence of contacts and relations of Central European population of CWC to the Black Sea and North Caucasian territories. The question of to what extent the East European civilisations have also genetically participated in the rise and development of MCWC (it appears in our territory de facto completely formed, the finds from the

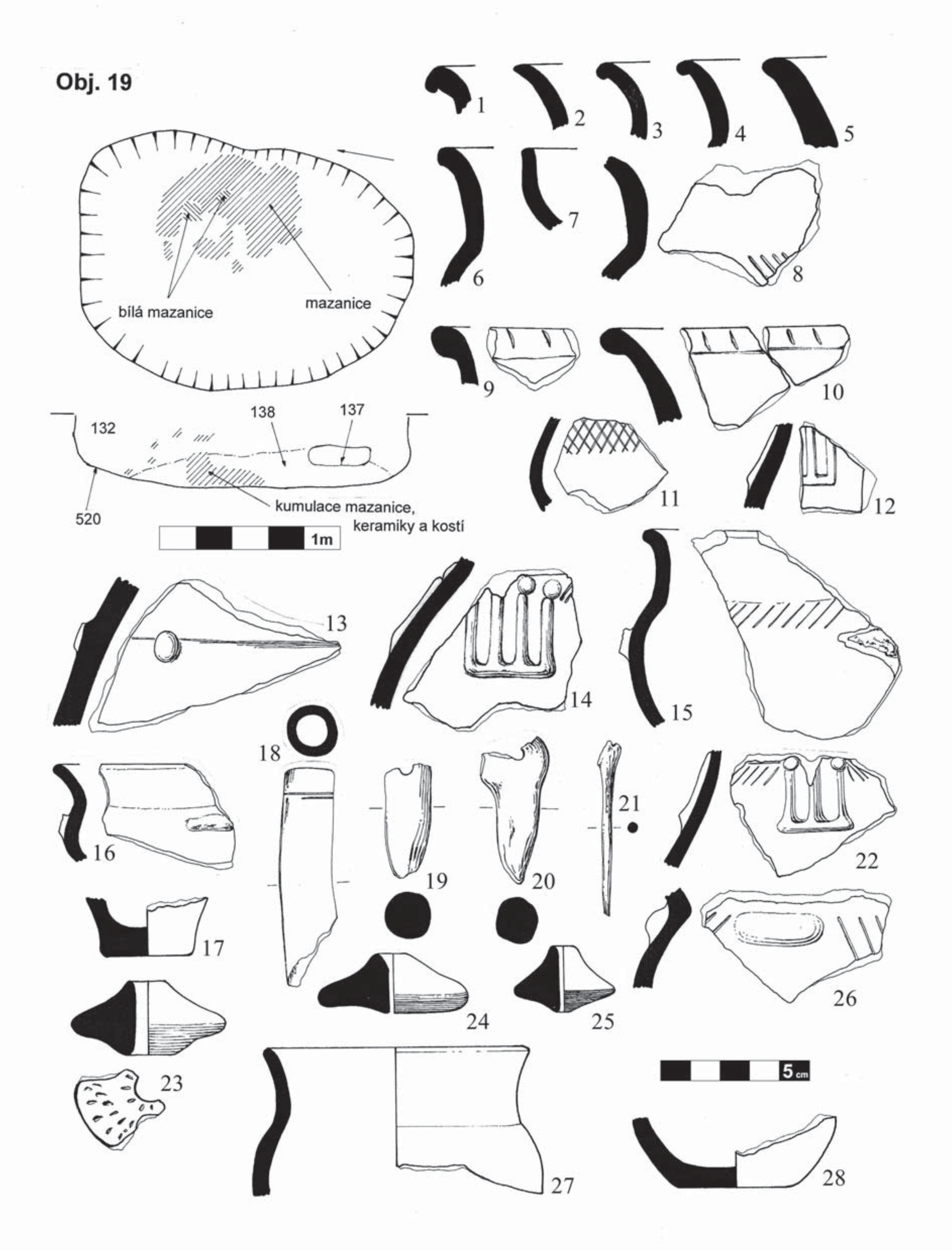

Fig. 11. Kroměříž 3 – Miňůvky, selection of finds from a settlement of Late Jevišovice Culture (after PEŠKA *2011)*

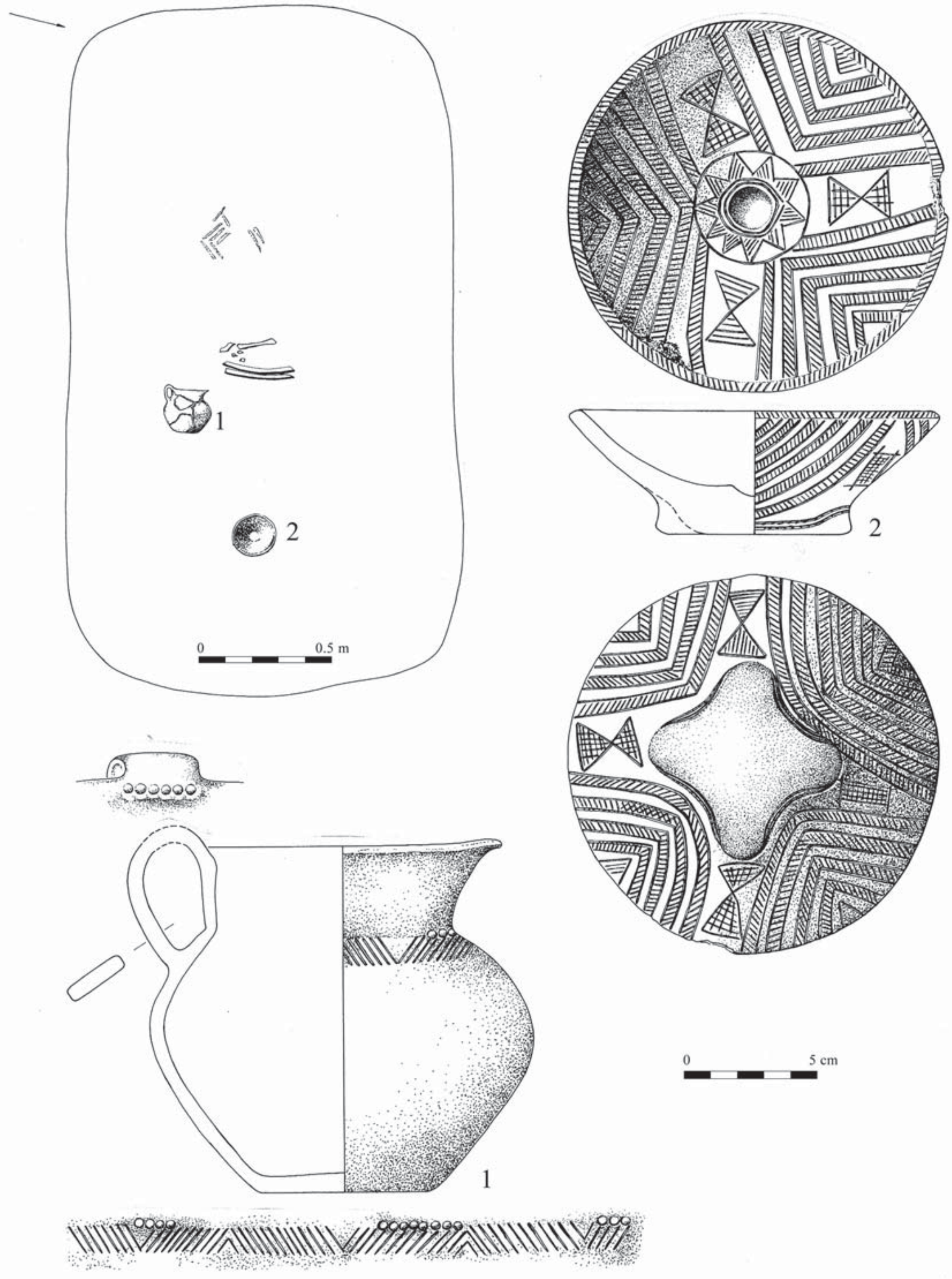

Fig. 12. Kroměříž 3 – Miňůvky H1, a grave of Jevišovice Culture with an askoid jug and a footed bowl decorated on both inner and outer surface (after Peška *2011)*

initial phase are almost absent, in the early phase we identify strong relations to the Bohemian CWC) must be answered by further, mainly archaeogenetic, research.

In the Post-Yamnaya period, we are currently trying to distinguish steppe components in the context of the Bell Beaker phenomenon (Harrison – Heyd 2007; Heyd 2016; 2017; 2019) and many elements from eastern steppes still can be found in the Early Bronze Age as well (ochre in Branč, willow-leaf industry in the Epi-Corded Cultural Complex, construction of the grave at Jelšovce with analogies in Srubnaya Culture, circular complex at Vráble-Fidvár with relations to the Sintashta-Petrovka sphere, stele from Spišský Štvrtok? etc.). So, it is evident that the contacts and influences from the East European steppe zone were in no way an ephemeral and one-time event, but occurred repeatedly in waves with various intensity during the Eneolithic and at the beginning of the Early Bronze Age. However, the intrusion of Yamnaya culture around 3000 BC seems to have been strongest, with wide-reaching impact including the formation and development of the Moravian group of CWC, in which these relations are very intensively demonstrated. Their essence, structure and character (direct population influx, influences, long-distance contacts? etc.) are to be identified and explored by future research, preferably in interdisciplinary collaboration.

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The Emergence of the Corded Ware Culture in Northern Central Europe

SEBASTIAN SCHULTRICH

Abstract

Advances in biochemical studies have revived old narratives for the emergence of the Corded Ware Culture in the early 3rd millennium BC. The studies offer only simple and monocausal explanations for the transformations. Fundamental is the assumption that a cultural break occurred with the onset of this archaeological culture. However, in northern Central Europe, many cultural continuities appear that contest these simple explanations. From the local perspective of northernmost Germany, the land use remained stable, many megaliths were re-used regularly and even a causewayed enclosure was re-used. Furthermore, a regional perspective shows that other supposed Corded Ware features are already present in the Late Neolithic. In addition to individual graves, we can identify individualised burials within collective graves as well as a war-like social identity already. Moreover, there was a supra-regional consensus concerning the battle-axe idea. The number of battle-axes from burials increases significantly during the Late Neolithic and thus before the onset of the Corded Ware Culture. From a northern German perspective, we cannot identify a cultural break that indicates a new ideology or even a new population. Already existing super-regional networks and identities during the Late Neolithic facilitated the expansion of Corded Ware symbols and new ancestries at the onset of the Final Neolithic.

Key words: *battle-axes, Late Neolithic, Final Neolithic, Funnel Beaker Culture, Corded Ware Culture, Single Grave Culture, North Germany, collective graves, warrior identity*

Introduction

Recent biochemical (aDNA and strontium isotope) analyses clearly show that migrations happened in the 3rd millennium BC in Central Europe (Haak *et al*. 2015; Sjögren – Price – Kristiansen 2016; Kristiansen *et al*. 2017; Egfjord *et al*. 2021). However, these studies put forward simple and monocausal explanations for the cultural change during the transition from the Late Neolithic (LN; c. 3500–2800 BC) to the Final Neolithic (FN; c. 2800–2200 BC). They revived old ideas of large-scale migrations, violent conquests, the spread of illnesses, a passive role of females and that archaeological cultures represent coherent people sharing the same identity (e.g. Glob 1944; Gimbutas 1976). However, the interpretation of the data is much more complicated (cf. Heyd 2017; Furholt 2019; 2021; Kolář 2020). The simple explanations are based on top-down approaches. They neglect the archaeological knowledge gathered in the last decades and throw it back to “textbook narratives” as noted by Furholt (2019, 116–117). On the other hand, we must accept that the ancestral composition changes fundamentally in the 3rd millennium BC. Increasing evidence demonstrates that LN and FN individuals are genetically different (Immel *et al*. 2020; Papac *et al*. 2021). However, the initial idea of one and one-sided migration event does not stick (Heyd 2021; Furholt 2021; Drummer 2022).

Combining the archaeological and genetic evidence into one model is not similarly possible in each region. In some areas, such as Northern Germany, bone preservation is bad. Accordingly, our knowledge of the genetic structure remains unclear. Here, conventional archaeology is still the best way to evaluate the transformation. To understand the processes in this period, we have to acknowledge the regional diversity by using bottom-up approaches (cf. Furholt 2019; Kolář 2020). Recent examples of regional studies are Beckermann (2015), Iversen (2015), Kolář (2020) and Drummer (2022). Although these studies are based on very diverse approaches, they all testify to continuities in LN and FN traditions (see discussion). In this paper, we add another local and regional perspective.

Due to many recent studies, today Schleswig-Holstein (SH) is very suited for a detailed analysis. In this paper, I first highlight several aspects of continuity from this local perspective. This overview is followed by a broader, regional perspective that is based on re-examinations of LN collective burials and battle-axes. In Central Europe, collective burials appear in many regions. Scholars tend to associate these burials with a similar ideology of collectivism, although there are regional and temporal differences. This generalisation prevents identifying significances that remind of later individual burial rites. For LN battle-axes, Zápotocký's (1992) study is still the main source. However, many of his ideas need to be re-evaluated, especially some chronological assumptions. This gives new perspectives on both social changes and continuities in the Neolithic period. At the end of this paper, I attempt to combine the genetic and archaeological evidence into one model for Northern Germany.

Local perspective: Schleswig-Holstein

For Schleswig-Holstein[1], most scholars accept that the emergence of the Single Grave Culture (henceforth SGC), the local variant of the Corded Ware Culture (henceforth CWC), was associated with a massive cultural upheaval (e.g. Glob 1944; Struve 1955; Damm 1991; Hübner 2005; Kristiansen *et al*. 2017). However, they projected many of the arguments for this from Danish observations onto SH. In this paper, an independent examination of the burial findings from SH and related observations will show that this general transfer of assumptions is not adequate. Generally spoken, during the LN, the Funnel Beaker culture (FBC) built and used megalithic tombs, while, during the FN, the SGC buried their deceased in single graves under low barrows (Hübner 2005, 467). Both in Denmark and SH, LN megaliths are more frequently documented in the east than in the west (Furholt 2012, 125). In contrast, early burial mounds of the SGC mainly occur in the west (Hübner 2005, 655–656). Generally, the interpretation of this contrasting pattern of distribution is that the SGC intentionally avoided former areas of the FBC (Damm 1991, 202; Furholt 2012, 125).

However, SH differs from Denmark in many aspects. In SH, a relatively large number of megaliths do occur in the west. Accordingly, LN and FN burials overlap spatially (*Fig. 1*; cf. Dibbern 2016, 164–165). Generally, scholars assume that the ancient megaliths were re-used during the late SGC (Glob 1944, 189–190; Hübner 2005, 658; Iversen 2015, 79). However, the megaliths in SH were regularly re-used by the SGC already in an early phase (*Fig. 1*; cf. Schultrich 2018, 35–38, 213–219). This indicates that the SGC did not intentionally separate itself from the FBC. Thus, assumptions that are valid in Denmark do not apply to SH. On the Danish Islands, there are far more attributes of late SGC than of the early SGC, while on the mainland the early phase is better represented. That indicates a kind of gradual "migration" from west to east (Glob 1944; Ebbesen 2006; Iversen 2015, 46–51, 93). This assumption, too, has been transferred to SH without differentiation. In SH, however, many single finds of the early SGC (especially battle-axes) are indeed found from the east (*Fig. 2*). Grave finds, especially those with battle-axes, are rare in the east during the entire FN and not only in the early phase. Based on flint daggers and bronze axes, this pattern is even still present during the subsequent Early Bronze

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[1] Adjoining Jutland to the north, the federal state of Schleswig-Holstein forms the southern part of the Cimbrian Peninsula.

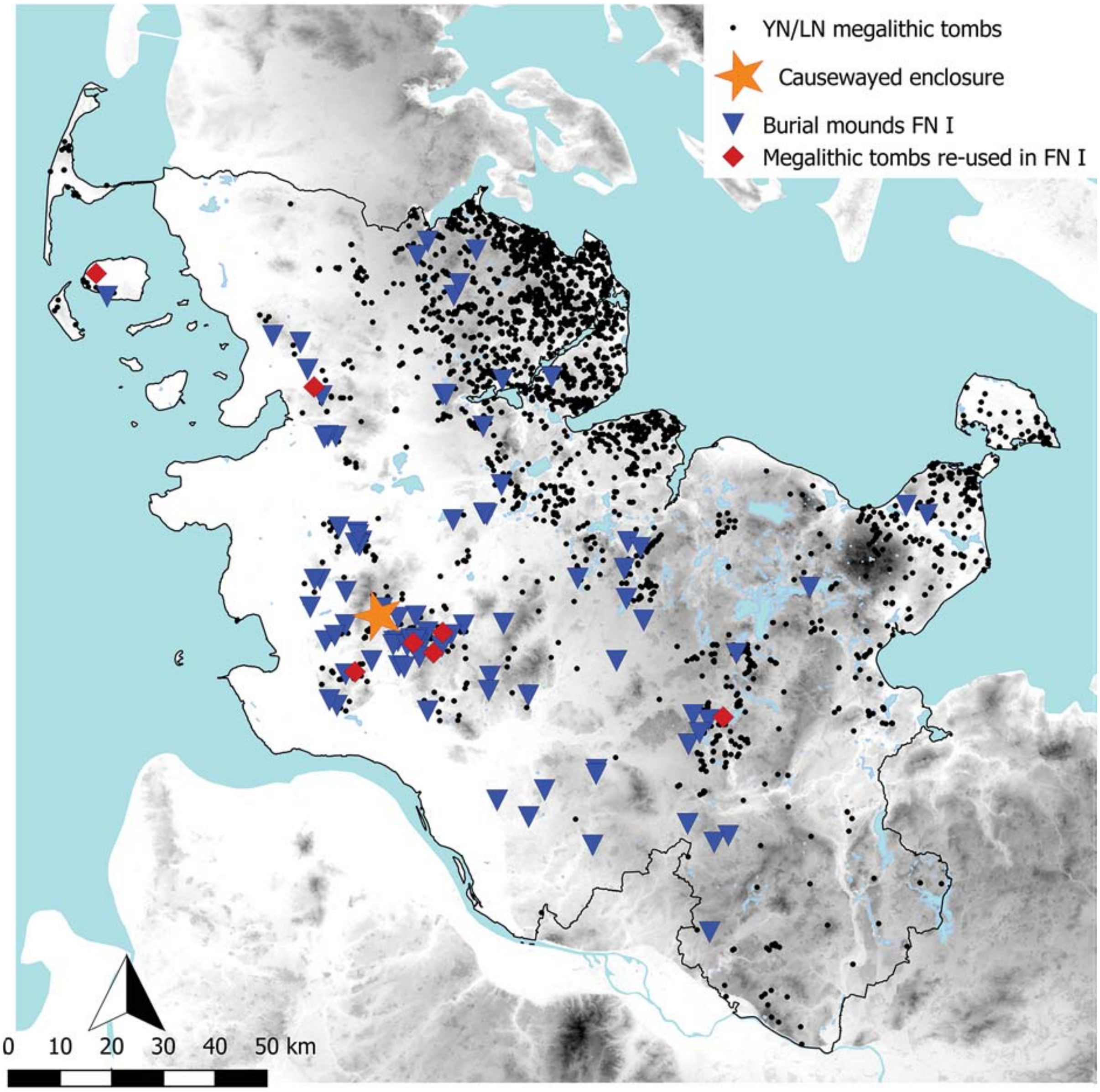

Fig. 1. Distribution of relevant Younger Neolithic, Late Neolithic and early Final Neolithic burials in Schleswig-Holstein. Note the spatial overlap of newly erected and re-used burials in the west, where also the re-used causewayed enclosure is located. Illustration: S. Schultrich

Age (EBA; c. 2250–1700 BC) (Schultrich 2018, 247–254). Thus, grave finds with certain symbolic artefacts are frequent in the west, but rare in the east during the entire FN and the EBA. Single finds, on the other hand, occur frequently in the east in all periods. Accordingly, there is a structural difference between the west and the east, but we cannot reconstruct a gradual "migration".

Many scholars emphasise that a new economy and a new settlement system accompanied the emergence of the CWC (Glob 1944; Struve 1955; Klassen 2008). FN settlements were allegedly restricted to the west, as the poorer soils on the Old Drift of the Saale glaciation were supposedly more suitable for cultivating barley. In addition, the west was supposedly better suited for transhumant pasture farming. Wheat, in contrast, which is considered the typical FBC cereal, thrived better in the east on the

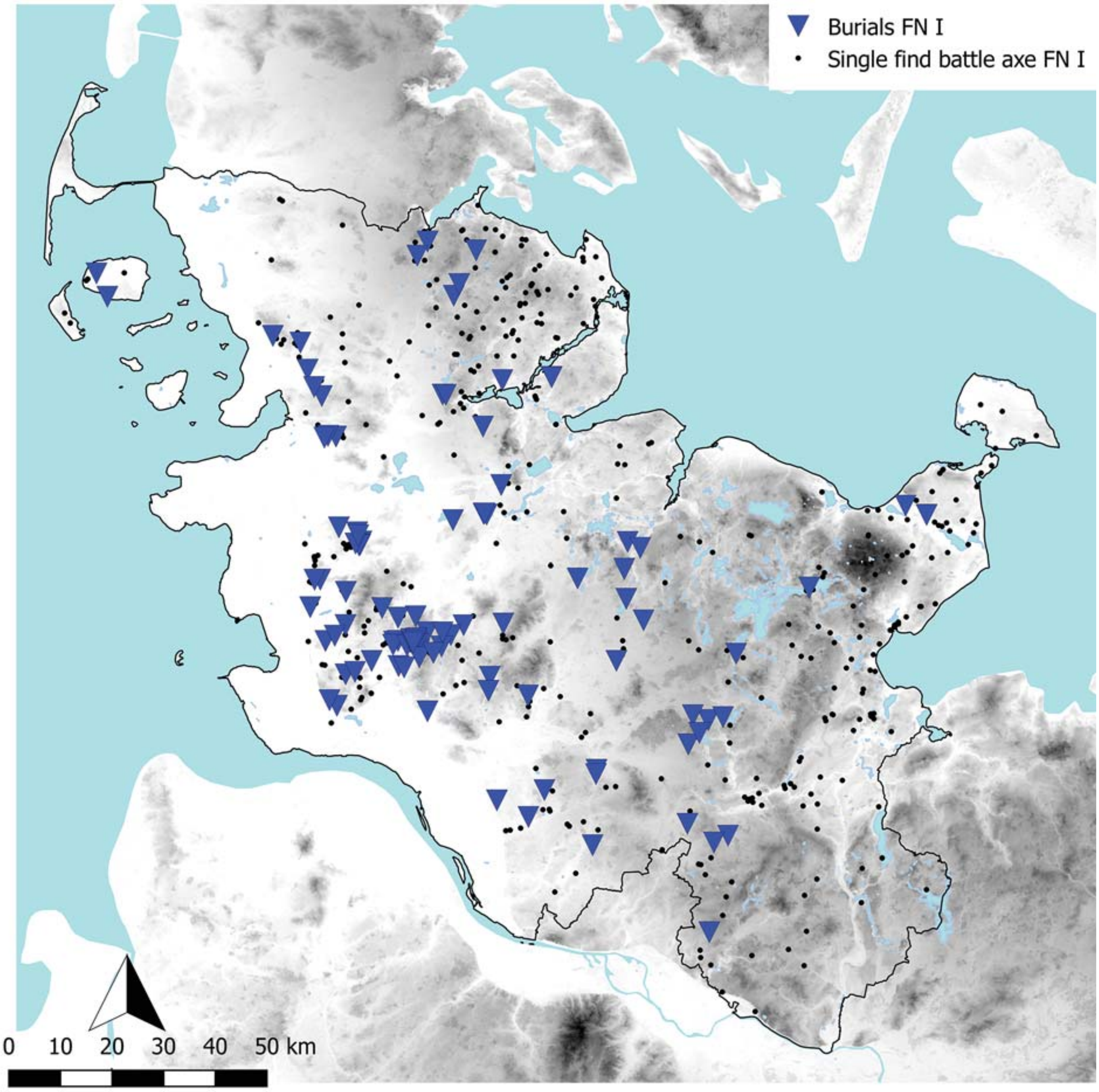

Fig. 2. Distribution of early Final Neolithic burials and single finds of battle-axes in Schleswig-Holstein. Note the presence of battle-axes in the eastern part of the region, known for its lack of burials. Illustration: S. Schultrich

moraines of the Weichselian glaciation (Glob 1944; Struve 1955; Klassen 2008, 59–60; cf. Møbjerg – Mose Jensen – Hambro Mikkelsen 2007, 27). Today, with modern techniques, soils in the east yield more than in the west. However, this is not transferable to the Neolithic and the methods employed during that time (cf. Hecht 2007, 193–194). In contrast, presumably both the FBC and the SGC used sandy soils for cultivation (Klassen 2008, 59–60; cf. Sherratt 2004, 422). Furthermore, we observe not only in SH but also regionally that significant changes in settlement and subsistence patterns already occurred during the late LN. At this time, the large settlement agglomerations were abandoned (Hage 2016, 195–197). The settlements were henceforth smaller and dispersed (Brozio 2016, 116). The pollen diagrams show that changed handling of the environment began in the late 4th millennium BC. Although

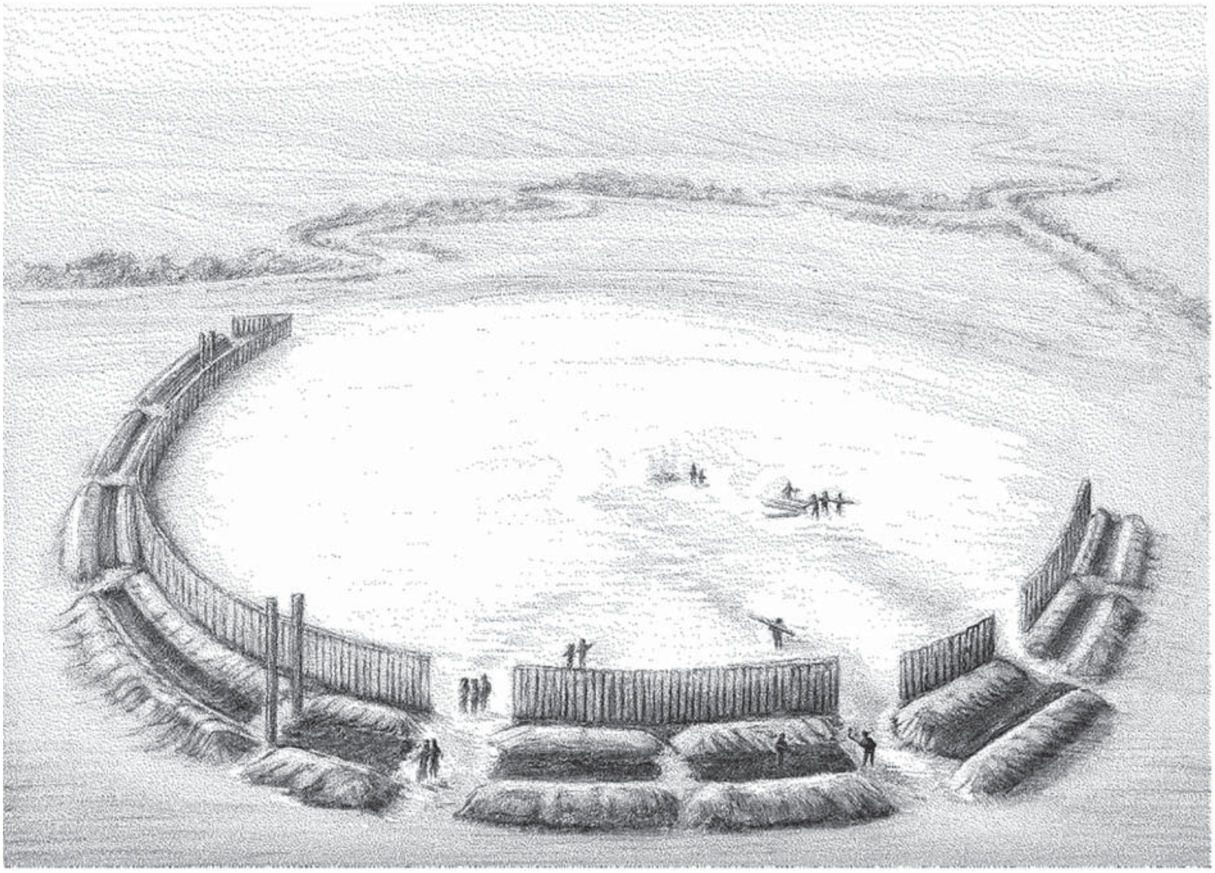

Fig. 3. Reconstruction of the Albersdorf-Dieksknöll enclosure under construction in its early phase. Illustration: S. Beyer

landscape uses in western and eastern SH were different, they were each stable at the transition from the LN to the FN (Feeser *et al*. 2012, 185–187; Feeser–Dörfler 2016, 23; Brozio 2016, 185).

On the Danish Islands, megalithic tombs were used quite often during the late LN (Iversen 2015, 77–79). In SH and Jutland, on the other hand, late LN pottery lack in the burials, indicating that the megalithic graves were already out of use during the late LN (Jensen 2001, 383).[2]An important finding concerning the evaluation of potential cultural continuities is supplied by the Albersdorf-Dieksknöll enclosure (*Fig. 3*).

In northern Central Europe, there are two types of enclosures. Causewayed enclosures, which were built in the early to middle 4th millennium BC, consist of one or two surrounding ditch systems. Palisade enclosures, which were erected in the early 3rd millennium BC, do not possess surrounding ditches, but one or more palisades. They occur on Zealand, Bornholm and in Scania only (Klatt 2009, 67–70; Larsson 2012, 110–118; Iversen 2015, 69). Causewayed enclosures were places of collective activity. People re-used them cyclically, but with intervals of several generations (*Fig. 4*). Among other activities, we can reconstruct several re-cuts of the ditches, artefact depositions and fire sets in the ditches. The installation and re-cuttings required the labour of many participants and the knowledge was transferred orally over generations. This shows that enclosures were important places for the societies related to a specific world-view (Larsson 2012, 119; Müller 2018, 9–10).

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[2] However, a shift in burial rituals may bias this observation. In the so-called cattle burials of the late LN, pottery does not occur frequently, whereas flint axes do (Jensen 2001, 398–402).

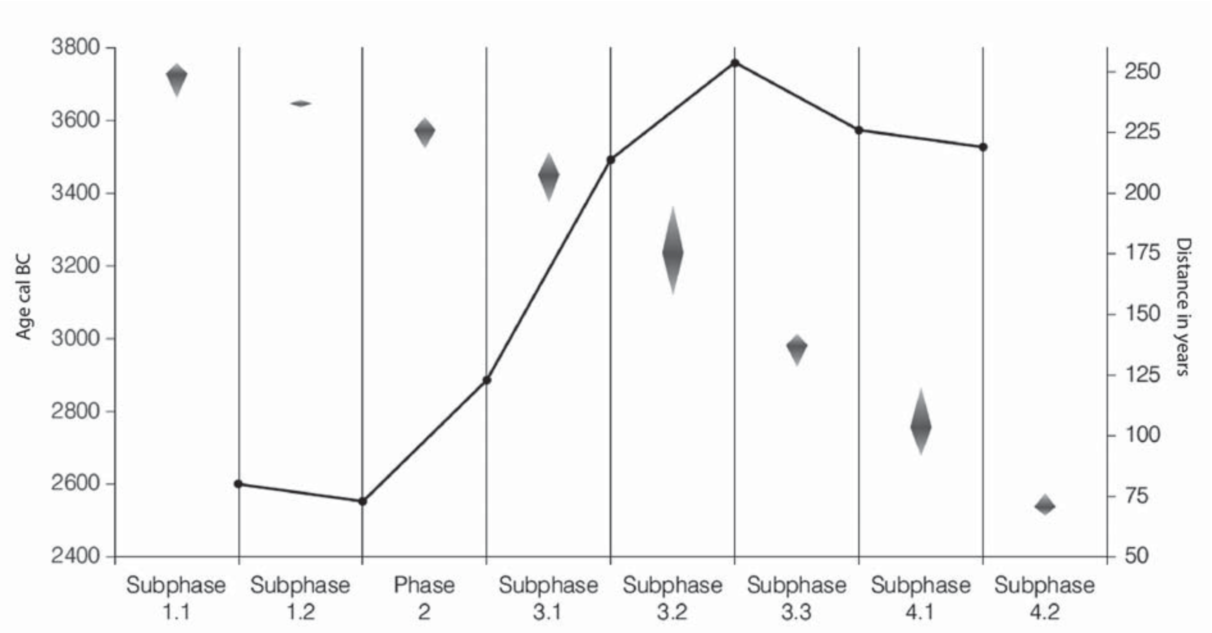

Fig. 4. Chronological model of the use of the enclosure Albersdorf-Dieksknöll. Grey: Absolute dating of the use phases. Black: Time between the re-cuttings. Sub-phases 4.1–4.2 are the Final Neolithic phases (phase 4.1: 2880–2640 BC; phase 4.2: 2580–2480 BC). A use in this period is a unique finding (Dibbern 2016). Illustration: H. Dibbern

Most causewayed enclosures were abandoned during the late LN, indicating that old traditions became obsolete during this time (Klatt 2009, 65; Larsson 2012, 120). However, the Albersdorf-Dieksnöll enclosure was not abandoned (*Fig. 4*). The intervals between the phases of use are set to ca. 100–200 years and reach into the 3rd millennium BC (Dibbern 2016, 45–51). Consequently, in western SH, a certain tradition was maintained. The enclosure was an important place for the people during the LN and the FN. According to Müller (2018, 15), the people maintained a collective memory. That complements the observation that the megaliths of the surrounding area were revisited as well (*Fig. 1*). Therefore, the FBC and SGC did not intentionally avoid each other. Summing up, this local perspective clearly shows that many changes took place during the late LN and not at the onset of the FN. Especially in the west of SH, there is a great amount of continuity. Experts from other regions (e.g. Beckermann 2015; Iversen 2015; Kolář 2020; Drummer 2022) also consider the LN–FN transformation as a phase of continuity, as I will explain further in the following sub-chapters. It is essential to take these regional studies into account when assessing the processes at the turn to the FN (cf. Furholt 2019, 125).

Regional burial perspective

Supposedly, the transition from the LN to the FN was a radical event, especially because of the alleged different burial traditions. In the FN, individual graves occur where individuals are directly associated with grave goods. In addition, specific gendered identities appears. Many researchers consider this novel burial practice as the beginning of individuality. In contrast, they do not reconstruct individual identities in LN collective tombs. Thus, they present the societies and/or ideologies of the LN and FN as antipodes of each other (Damm 1991, 202; Hübner 2005, 694–719; Furholt 2012, 125; Kristiansen *et al*. 2017).

However, single graves also occur in the YN (Younger Neolithic) and the LN in many regions (Kossian 2005; Müller 2019, 46). During the late LN, we find single graves in north-western Germany and especially in the Netherlands (FBC horizons Brindley 4–7; c. 3000–2800/2750 BC; cf. Brindley 1986, 95–100). In northern and western Jutland, we find so-called cattle burials (or stone-heap graves) of the same date (horizons MN III–V; c. 3000–2800 BC; cf. Iversen 2015, 19–21). These burials probably represent single graves and they show parallels to Central and Eastern European contexts (Jensen 2001, 400; Johannsen – Nielsen – Jensen 2016, 42–48).

Those LN single burials consist of relatively standardised sets of grave gifts that reflect the respective local tradition of the megaliths (Jensen 2001, 398–402; van der Velde – Bouma – Raemaekers 2019, 319–323). However, some features are similar to later SGC traditions. The LN cattle burials and the earliest FN single graves in Jutland do not contain much pottery, but they combine battle-axes and flint axes (Jensen 2001, 398–402; Hübner 2005, 640–647; Furholt 2014, 72). In the Netherlands, the grave architectures (stone and wooden cists, [rare] burial mounds and crouched positions) of the LN single graves are like those of the SGC (Lanting 2018, 108; van der Velde – Bouma – Raemaekers 2019, 319–323). Both cases demonstrate that single burials and specific combinations of grave goods are not entirely new at the onset of the FN.

In addition to the LN single graves, we can also recognise indications for individual burials inside the collective graves. Generally, we must criticise the term collective grave. It obscures regional and temporal differences and the individual biographies of the burials. Unfortunately, the bone preservation in Northern Germany is too poor to make clear statements. However, a super-regional comparison shows major differences in collective burial traditions. In the gallery graves of Western Germany and the Paris Basin, up to several hundred individuals are buried in anatomically incorrect positions (rearranged secondarily). Moreover, primarily in the entrances or antechambers, apart from the individuals, only a few and often intentionally broken grave goods appear (Sohn 2002; Pape 2019, 222–224; cf. *Fig. 5*). In other collective burials, the individuals possess more grave goods, directly in the chambers. Furthermore, the individuals are not manipulated secondarily. This is the case in the rock-cut tombs (*hypogea*) of the

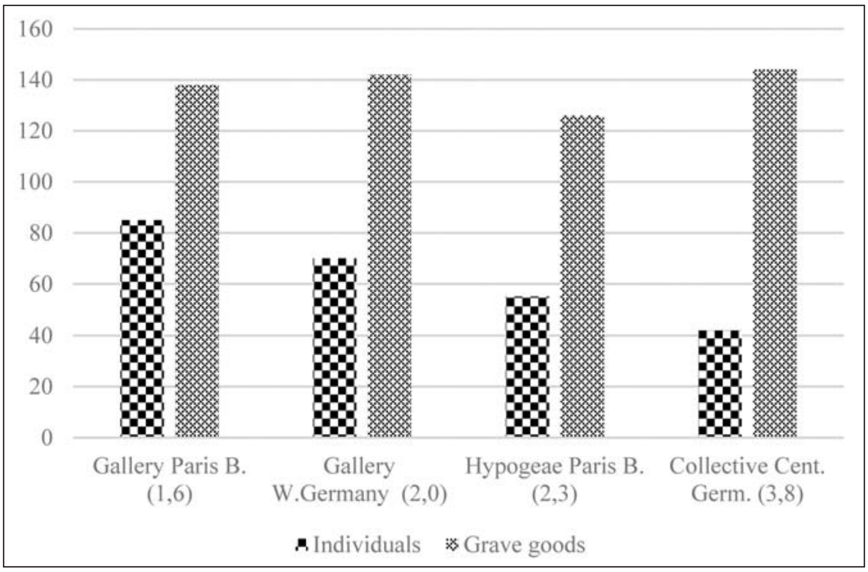

Fig. 5. The average number of individuals and grave gifts in different regions. The relation between individuals and grave finds is set in brackets (Data according to Cottiaux et al. 2014 who obtained data from 53 chosen burials). Illustration: S. Schultrich

eastern Paris Basin. Here, too, gender-specific differences are already present in the LN (Cottiaux *et al*. 2014, 515; Blin 2015, 590–592).

In Central Germany, we find both graves with manipulated and non-manipulated individuals (Müller 2001, 338; Midgley 2007, 82–84). This, too, is indicated in Northern Germany and Southern Scandinavia, despite poor preservation (Jensen 2001, 359–362; Mischka – Furholt 2019, 926). Generally, the frequency of grave goods is much higher in Central German collective burials than in gallery graves (*Fig. 5*). In addition, many grave goods of good quality appear in the chambers of Central and Northern Germany and Southern Scandinavia (Cottiaux *et al*. 2014, 515). There is a clear difference between coarse settlement pottery and fine grave pottery in these regions (Jensen 2001, 298–315; cf. Iversen 2015, 50–55; Brozio 2016, 57–60, 146–149). In the gallery graves of the Paris Basin, in contrast, only coarse pottery was used as grave gifts infrequently (Cottiaux *et al*. 2014, 459–464). The LN battle-axes also fit into the pattern of different body and grave gift treatment. They appear in gallery graves as broken pieces only, while in passage graves they mostly are complete, as I will explain further in the following sub-chapters.

In southern Germany, we just know a few LN burials (cf. e.g. Matuschik *et al*. 2009). We must interpret this as an intentional burial custom that we cannot reconstruct archaeologically (Furholt 2009, 133). Here, the individuals were completely deconstructed after death. To sum up, this regional comparison shows that the term collective grave is ambiguous. The grave rituals appear to be very diverse (cf. Veit 1993, 3–4; Cottiaux *et al*. 2014, 515). Figuratively speaking, there is a scale ranging from more to less individualised burial rites and the different megalithic traditions tend to the one or the other end of the scale (*Fig. 6*). Maybe, the different burial customs mirror differences in the worldview of the societies. Either the deceased were deconstructed and entered a common sphere of ancestors, or they kept concrete individuals. In the latter case, they could refer to an idealistic identity (cf. Veit 1993; Robb – Harris 2018).

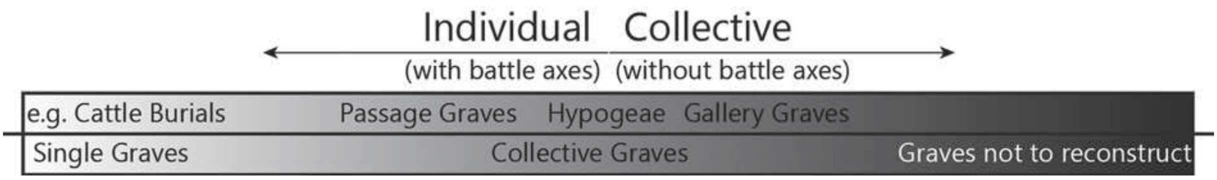

Fig. 6. A simplified scale to demonstrate the differences between the grave types. On the left are individual graves as one extreme and on the right is the Southern German lack of burials as the other extreme. In between are the different collective graves. Proper battle-axes occur in the middle and on the left side only. Illustration: S. Schultrich

Regional perspective on YN, LN and FN battle-axes

Battle-axes are key to understanding continuities in social behaviour during the Central European Neolithic. However, we have to leave old-established typochronological models. The main reference to YN and LN battle-axes to date is Zápotocký's study (1992). However, he did not include all known types of axes – lancet-shaped-axes (L-axes) lack as do French double-axes (*bipennes*). Furthermore, some of his chronological assumptions are not valid any longer. Especially his supposed dating of an axe type called KIVb turned out to be significantly wrong (see below). In addition, the duration of several other types has been adjusted since (Madsen 1994, 328; Schultrich 2022). Simplifying Zápotocký's typology, we can distinguish hammer-axes and non-hammer-axes. The former consists of a hammer-like butt end, either flat or round, and a distinctive cutting edge. They occur primarily in the YN in many regions and there are strong typological similarities (Zápotocký 1992, 66–69).

During the LN, the regional variability increases. We find different types of non-hammer-axes: R-axes (*Fig. 7.10*) have round necks that are often shaped unintentionally. We find them frequently in Central Germany and the Czech Republic (Zápotocký 1992, 107–110). Double-axes (D- und L-axes) are (almost) symmetrical axes with two cutting edges. In northern Germany, Denmark and Sweden, we find double-axes called D-axes (Zápotocký 1992, 130–133; cf. Iversen 2015, 46; *Fig. 7.6*), while in Central and Southern Germany, Austria and Switzerland L-axes occur (Maier 1964, 120–124; Beran 1990, 8–12; Köninger 2012, 33–35; *Fig. 7.8–9*). In France, *bipennes* appear (e.g. Gachina – Gomez

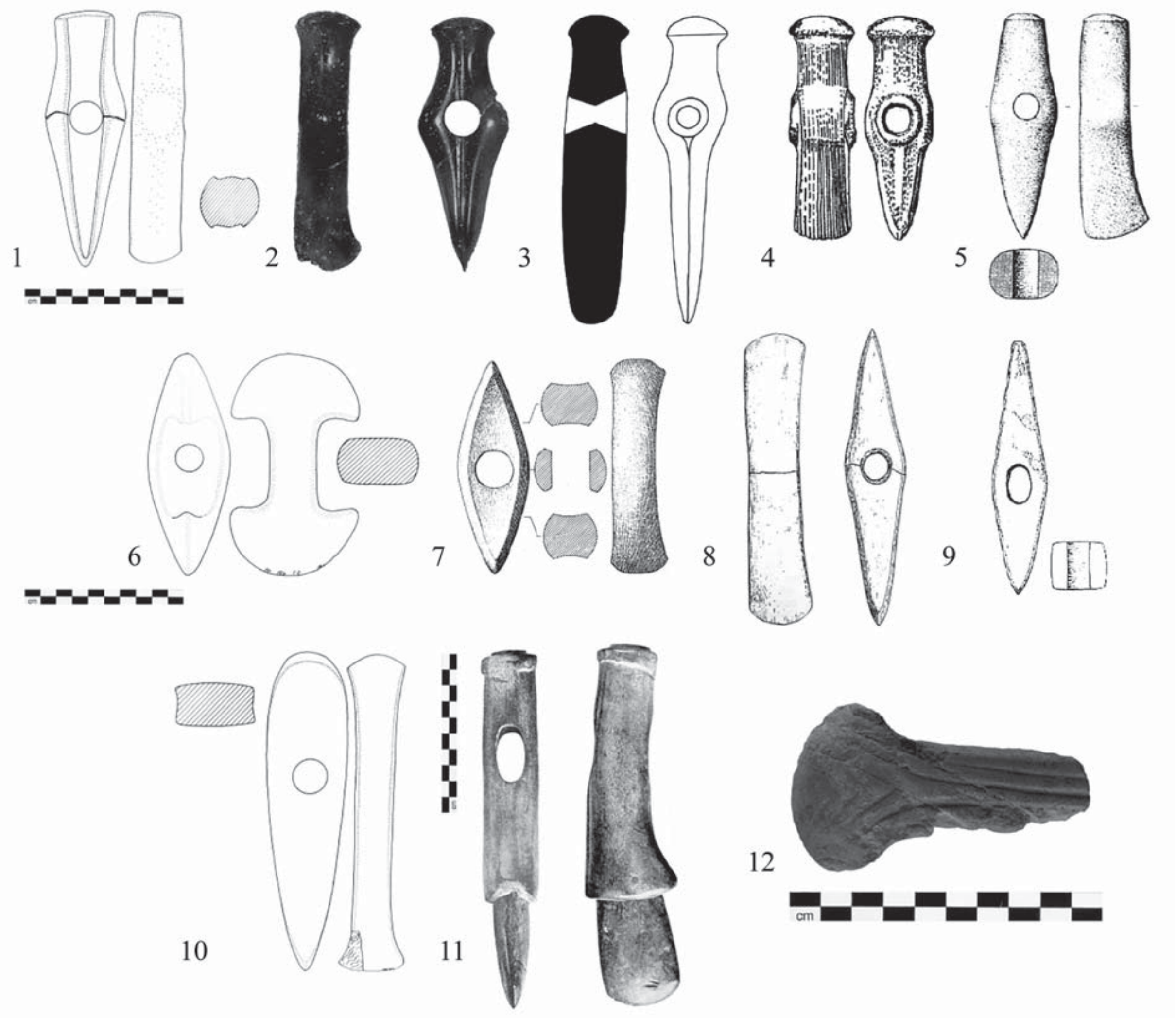

Fig. 7. Various battle-axes from the YN, the LN and the FN. Top row: Hammer axes (1. YN FI-axe, Heringsdorf, Northern Germany, 2. YN KIV-axe, Weiach, Switzerland, 3. LN Knob-butted axe, Senigallia, Italy, 4. LN KIVb-axe, Netherlands, 5. FN A-axe, Großflintbek, Northern Germany). Central row: Double axes (6. LN DII-axt, Melzow, Eastern Germany, 7. LN Bipenne, Pierrefitte-sur-Sauldre, Centre-Val de Loire, France, 8. LN L-axe, Lüscherz, Switzerland, 9. LN L-axe, Konstanz, Southwestern Germany). Lower row: Round butted axes and an antler battle-axe (10. LN RIV-axe, Bruchwedel, Northern Germany, 11. LN antler axe, Kattendijkdok, Belgium, 12. Fragment of LN RV-axe from a gallery grave in Schmerlecke, Western Germany). (For the references of the respective specimens, cf. Schultrich *2022). Illustration: S. Schultrich*

– Coffyn 1975; Giot – L'Helgouach – Monnier 1979; Schultrich 2022; *Fig. 7.7*). R-axes and the various double-axes are mixed typologically (Zápotocký 1992, 120). In the FN, we again meet certain hammer-axes. Especially so-called A-axes appear super-regionally (Struve 1955; Buchvaldek 1986; *Fig. 7.5*). However, typical, 'pan-European' A-axes are not the earliest CWC axes as supposed in earlier studies (Hübner 2005, 143–146). The different shape of the FN A-axes and the LN specimens is often used as a supporting argument that a cultural break occurred with the emergence of the CWC (e.g. Zápotocký 1992, 2). Moreover, the rapid replacement of the LN R-, D- and L-axes at the turn to the FN supports this. Furthermore, many researchers highlight the widespread distribution of the allegedly homogenous A-axes. This, in turn, supposedly points to a common origin of the axes and the CWC in general (Buchvaldek 1986; Furholt 2014).

However, YN hammer-axes appear widespread in Central and Eastern Europe as well. LN axes are also widespread and they, too, appear abruptly. They replace the YN hammer-axes in Central Europe in the middle of the 4th millennium BC (Zápotocký 1992, 198–200). Thus, wide distributed axes, and rapid adaptations of new shapes, are not exclusive features of the emerging CWC. We observe this pattern repeatedly. Accordingly, there was a supra-regional consensus regarding the battle-axe idea from the YN to the FN (cf. Klimscha 2016, 86). This temporal broader perspective limits the assumed innovation of the A-axes and thus, the CWC. Furthermore, the alleged novelty of integrating axes into individual graves must also be considered in perspective.

Regional perspective on battle-axes in burials

During the YN, battle-axes rarely occur in graves. This change during the LN in northern Central Europe (*Fig. 8*). As seen already, regional differences in the treatment of the bodies and the number, position and state of the grave goods appear. Battle-axes follow this pattern. Generally, in Western Germany, LN battle-axes are rare. Just a few stray and grave finds appear (*Fig. 9*). In some gallery graves, fragments of battle-axes or mundane 'working shaft-hole axes' occur, but we do not know proper and unbroken examples (Rinne 2003, 58, 104; cf. *Fig. 7.12*). In the Paris Basin, lithic battle-axes are rare and never appear in burials (Schultrich 2022). On the other hand, antler axes[3] occur (*Fig. 7.11*). These axes are found significantly more frequently in *hypogea* than in gallery graves (Sohn 2002, 510; cf. Blin 2015). Thus, the number of axes correlates with the overall higher number of grave gifts and a different treatment of the dead.

In southern Germany, Austria and Switzerland, the deposition of L-axes follows ancient patterns (Maier 1964, 120–124), and accordingly, the axes were not integrated into burials. However, this might also be related to the overall lack of LN burials (cf. Furholt 2009, 133). In contrast, we find numerous LN battle-axes in the collective graves (*Fig. 9*). Furthermore, predominantly they appear not to be fragmented, despite local differences (Zápotocký 1992, 164–166). Mundane shaft-hole axes, however, are missing in burials contexts (Zápotocký 1992; Iversen 2015, 46–47). Thus, there is a correlation between grave goods of high quality and the number and the state of battle-axes. In northern Central Europe, 10–20 % (peak ø 22 %) of all battle-axes were deposited in burial contexts during the LN. That does not appear much, but FN battle-axes do not reach the same proportions (*Fig. 8*: 28th century).

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[3] These peculiar artefacts are composed of an antler shaft and a flint axe. Due to their shaft-hole, they were handled just as battle-axes of stone. Rare depictions of these axes in some *hypogea* prove this (Charpy 2014, 413–416). In the *hypogea*, a spatial gender division appears. The females were predominantly buried on the right and the males on the left side of the chamber. Interestingly, the antler axes appear in the female area (Blin 2015, 590–592). That contests the general idea that tools and weapon-like artefacts belonged exclusively to males during the Neolithic.

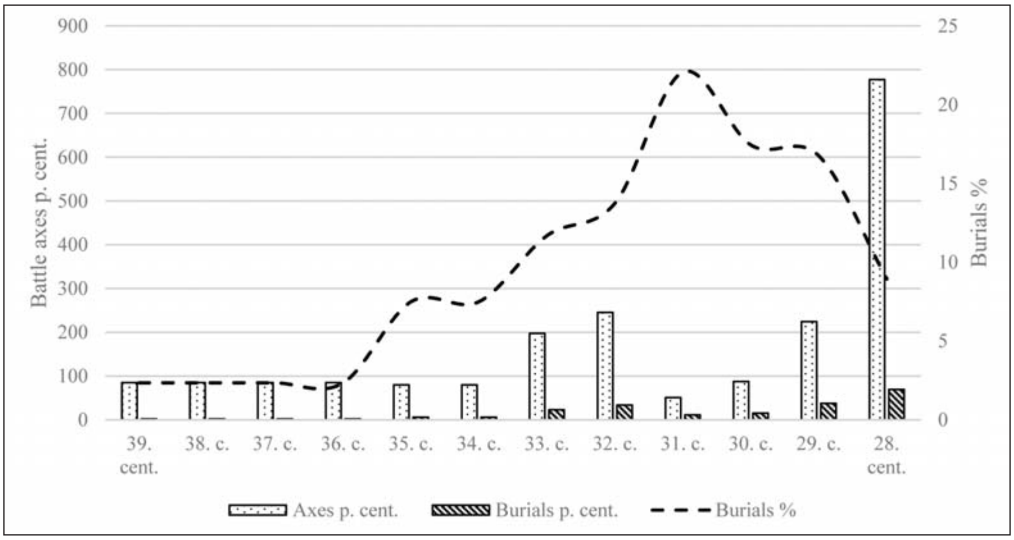

*Fig. 8. The consumption of Younger (39th–34th century BC), Late (33th–29th century BC) and early Final Neolithic (28th century BC) battle-axes per year. The dotted line shows the percentage of battle-axes that come from burial contexts. Illustrated are data from Northern Germany and Denmark, but the last time slice (28th century BC) is without Denmark as too many finds have been made there in this period which would exceed the scale (*Schultrich *2022). Illustration: S. Schultrich*

Accordingly, the decisive break in the tradition of using battle-axes as grave goods took place in the early LN and not at the threshold of the FN with the emergence of the CWC. Thus, this specific deposition pattern was handed down from the LN to the FN.

Repeated patterns and an alternative approach for the emergence of CWC A-axes

The emergence of FN hammer-axes is associated with a significant increase in absolute numbers (*Fig. 8*). Another new element in large parts of Central Europe is the individual burial customs that can integrate battle-axes (e.g. Heyd 2000; Hübner 2005). From this perspective, massive changes appear with the onset of the CWC in Southern Germany, where LN burials are lacking. The new shape of the FN A-axe made old traditions obsolete and this made it possible for a larger part of society to participate in certain social ideals.

In northern Central Europe, we detect a significant increase in the number of burial contexts with battle-axes also during the LN (*Fig. 8*). Accordingly, we face a particular phenomenon twice: with new shapes of battle-axes, new burial practices emerge. The basic concepts of hammer-axes and LN non-hammer-axes axes differ. Maybe, each axe form had its narrative. The LN axes did not any longer stick to the old narrative of YN hammer-axes and the FN hammer-axes did not stick to the narrative of LN axes.

We see the emergence and evolution of YN, LN and FN battle-axe shapes on a supra-regional scale. For example, the concept of the LN double-axes was accepted in northern Central Europe, Southern Germany and France (*Fig. 9*). Accordingly, there was a superregional understanding of basic morphological principles in a large area. Maybe, there even was a basic consensus concerning (parts of) the narrative of the battle-axe. This might explain the abrupt and rapid adoption of the FN A-axes. It rests on the LN network of shared narratives.

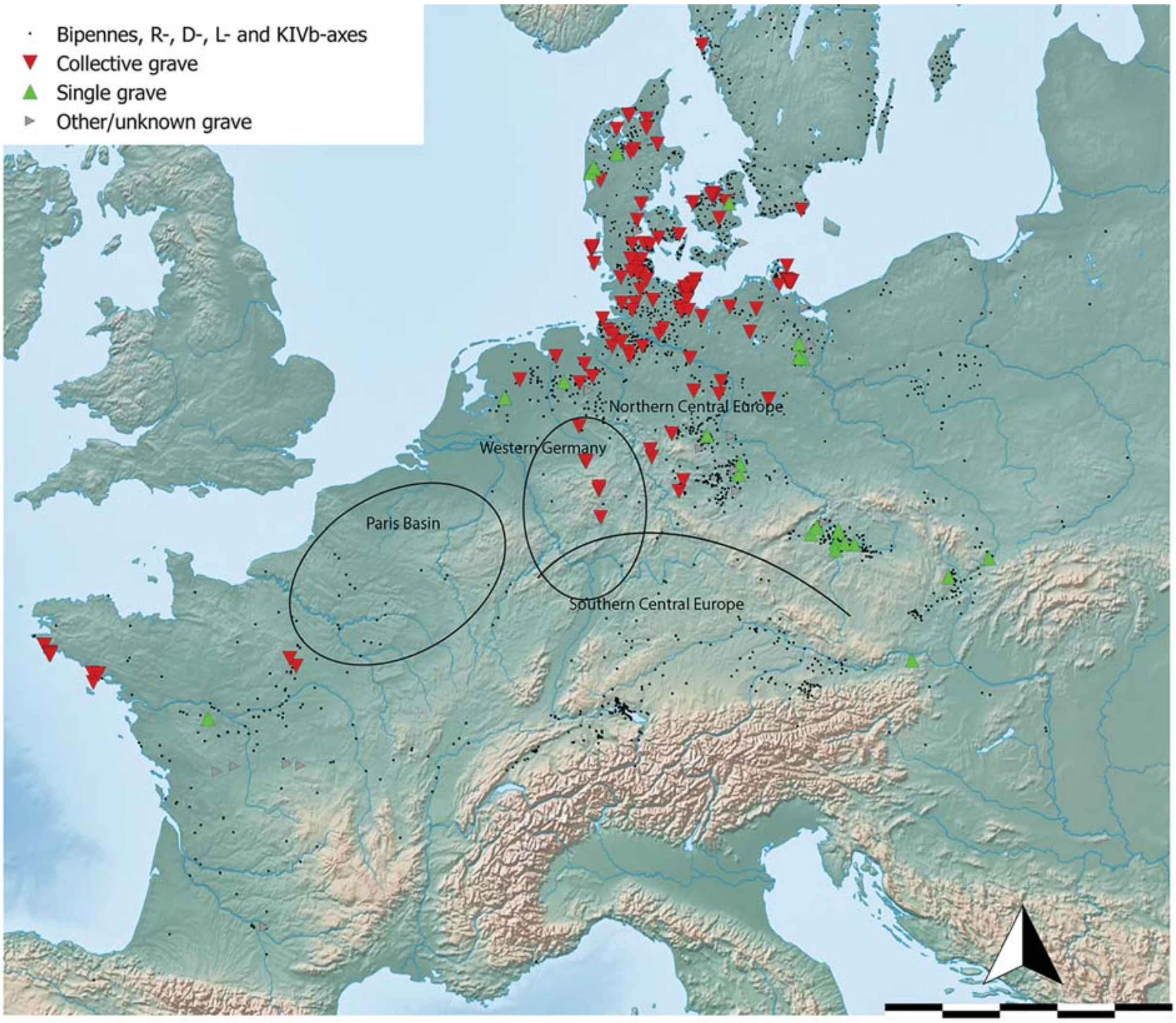

*Fig. 9. The distribution of single finds (black dots) and grave finds of LN battle-axes (*Schultrich *2022). Illustration: S. Schultrich*

In the research on the CWC, the notion is prevalent that all CWC attributes possess distinct places of origin (cf. Struve 1955; Buchvaldek 1986). For example, Furholt (2014, 72–74; 2019) is not looking for the emergence of A-axes in Eastern Central Europe any longer but proposes Jutland as the region of origin. Nevertheless, still, he assumes that CWC attributes were distributed structurally. With the knowledge of the YN and LN battle-axe networks, we can propose an alternative explanation. Namely, for A-axes, no specific place of origin is present. It evolved in the network. This idea contests the prevalent notion. It also explains the regional and local differences in the shapes that were present from the very beginning of CWC axes.[4] The main idea of the hammer-axe is identical in all regions, but its definite shape and context were negotiated locally (cf. Ribeiro 2018, 113–115).

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[4] E.g. in Jutland, highly elaborate hammer-axes (A2, A3, different B-, C- and D-axes) occur before the classical, 'pan-European' A-axe (Hübner 2005, 143–146). The classic A-axe is spread super-regionally and was part of the so-called A-horizon. Originally, this horizon marked the beginning of the CWC in many regions (Buchvaldek 1986). However, in the meanwhile this horizon was deconstructed (Furholt 2014, 72–73).

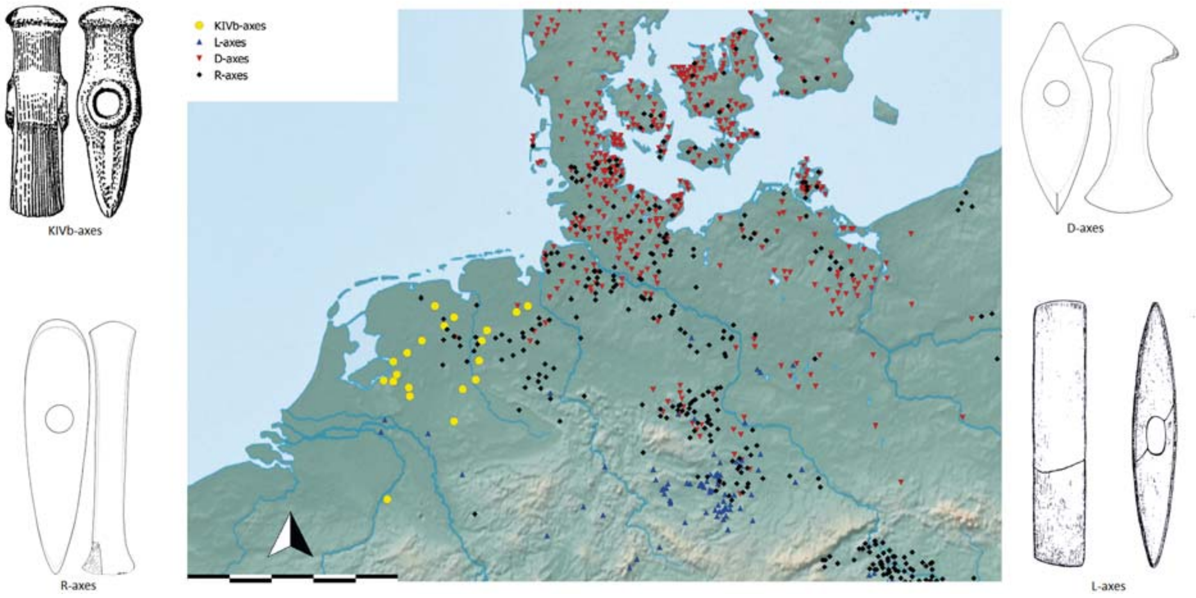

Fig. 10. Distribution of battle-axes of the late 4th and the early 3rd millennium BC.
Note the mutual exclusion of hammer axes (KIVb) and double axes (D). Axes without scale.
(Data according to Beran 1990; Zápotocký 1992; Lanting 2018). Illustration: S. Schultrich

Here, I present an alternative approach to the origin of the FN A-axes. The YN and FN battle-axes follow the same morphological principle: they are hammer-axes. To put them in a direct connection does not seem adequate because of the hiatus between them, which according to Zápotocký's (1992) dating, spans 700 years (3500–2800 BC). However, Madsen (1994) has already shown that K-axes in southern Scandinavia appear at least until 3300 BC. Furthermore, various K-axes appear during the LN in parts of Eastern Europe and the Caucasus (e.g. Hansen 2010, 303–304), in Northern and Central Italy (Skeates 1992, 397; Jeunesse 2017, 171–175; *Fig. 7.3*) and in the Netherlands and Northwestern Germany K-axes occur until the threshold of the CWC (Lanting 2018, 114–115). The latter region deserves special mention. Here, LN R-axes are seldom and D-axes are completely missing, while KIVb-axes (according to Zápotocký's [1992] terminology) occur (*Fig. 7.4; Fig. 10*). That is the opposite situation in Central Europe, where double-axes occur but hammer-axes are missing during the LN. Thus, in all regions, the different axe concepts apparently could not coexist. They seem to have been mutually exclusive. That is a further argument for the idea that each axe form had its narrative.

Possibly, the existence of LN hammer axes enabled their adoption with the onset of the CWC. Here, hammer-axes quickly advanced to the predominant symbol. As the concepts seem to be mutually exclusive, the renaissance of the hammer-axe makes the LN shapes obsolete. With the new shape, or rather the very old one, a new narrative emerged and the absolute number of battle-axes rose drastically. Perhaps, the idealistic identity that is attached to the battle-axe became accessible to larger parts of the population.

The war-like identity during the LN

In Southern and Eastern Europe, individual burials and war-like artefacts occur in the 4th millennium BC (e.g. Hansen 2014; Heyd 2016; Jeunesse 2017).[5] Certain social identities are associated with this. These identities are idealistic as the set of grave goods is stereotypic and they involve the representation of certain identities (often gendered) in rock art (Robb – Harris 2018, 140–142). In Spain, Southern France and Italy, daggers and halberds are important war-like symbols. They were deposited predominantly as single finds and regularly in funerary contexts. They consist of stone, copper and antler. Moreover, they were engraved on rocks and stelae (Horn 2014, 76–84; Steininger 2015, 45–47; Jeunesse 2017, 172–177). This multifaceted presentation confirms the high symbolic significance of halberds and daggers during the LN in Southern Europe.

For Central Europe, most scholars agree that idealistic and gendered identities emerged with the onset of the FN CWC (e.g. Harrison – Heyd 2007; Jeunesse 2017). However, all these characteristics, that indicate idealistic identities in Southern and Eastern Europe, are also present in Central Europe during the LN. Here, LN battle-axes were deposited in graves regularly (*Fig. 8*). Battle-axes consist of stone, antler (cf. de Capitani *et al.* 2002; Cottiaux *et al.* 2014, 506–509) and copper. [6] Although rarely, they were engraved in burial chambers and on stelae (Hansen 2010, 304; Charpy 2014, 413–416). Just as daggers and halberds were the primary war-like artefact in Southern Europe during the LN, battle-axes fulfilled this function in Central Europe. Accordingly, in Central Europe, similar social ideals may have existed as in Southern (and Eastern) Europe during the late 4th millennium BC. The assumption that collective graves represent a society without individuals obscures the significance. Accordingly, the emergence of the CWC is not to be associated with an ideological reorientation. This process already took place beforehand. With the CWC certain ideals became more evident, as single graves and battle-axes became much more common. However, people did not invent such ideals at the onset of the FN.

Remarks on the genetic evidence

We see that there are continuities in LN and FN social and ritual behaviour. However, we also know that the individuals of the 3rd millennium BC in Central Europe have a new ancestry. Due to bad bone preservations, we do not know exactly the situation in the study area. However, we should expect the new ancestry here as well. The question arises of how to combine the genetic and archaeological evidence into one model for Northern Germany. In former studies on aDNA (e.g. Haak *et al.* 2015) the resolution of data was low. It covered a huge territory and a long period. This provided a target for criticism (Heyd 2017; Furholt 2019). The recent study of Papac *et al.* (2021), by contrast, has a high-resolution dataset on individuals from the Czech Republic. Here we see that R1a-haplotypes quickly predominate. Also, we see that the LN individuals never possess this ancestry (Papac *et al.* 2021, 5).

However, there are three important findings in the recent study by Papac *et al.* (2021) which limit drastic interpretations. Firstly, the earliest CWC burials were not associated with R1a exclusively. This is true for individuals of the early CWC Złota group as well who are genetically identical to Globular

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[5] Once again, we have to be cautious to avoid general statements. For example, many authors consider the burials of the Yamnaya culture to be war-like. However, there is hardly any evidence for this (Kaiser 2019, 93).

[6] According to the study of Kibbert (1980), so-called Zabitz-type axes (double-axes) date to the late FN and the EBA. However, now it is confirmed that they (also) date to the LN. Among other things, clear morphological analogies to L-axes of the Alpine region speak for this dating (general shape, oval shaft-holes, but also deposition in wetlands) (Bunnefeld 2019, 191; Schultrich 2022). Moreover, in Northwestern Germany, knob-butted copper axes occur during the LN (Schultrich 2022).

Amphorae (GAC) individuals (Schroeder *et al*. 2019, Fig. 2). Secondly, the spread of the ancestry was not male-dominated at the beginning. Thirdly, the dominance of the steppe ancestry is the result of a long process.

We observe a reduction in Y-chromosome variability since the end of the Palaeolithic (Zeng – Aw – Feldman 2018). Moreover, the rivalry also affects R1a. At the beginning of the FN, there are five R1a lineages, in the end, there is only one left (Papac *et al*. 2021, 6). Papac *et al.* (2021) calculate that an ongoing rate of about 15 % more descendants of one lineage is sufficient to cause the observations. Accordingly, we see a continuous process of rivalling male lineages that is not exclusively related to the steppe ancestry. Furthermore, the individuals may not have perceived this benefit by themselves (cf. Burmeister – Müller-Scheessel 2006, 9). We have to leave the notion of two blocks, the pre-steppe and steppe ancestry, as opposing each other. Whatever happened, we only gain a glimpse of the complex processes.

Discussion

We do not know, whether R1a-haplotypes were present in the study area from the onset of the FN. When we seek to combine the genetic and archaeological evidence into one model for the study area, we have to be aware of the complex situation in other regions: some regions fit the model of massive (or less massive) migrations while some do not. In the Dutch CWC, subsistence strategies and pottery production continue local LN traditions. The (massive) migration model did not turn out to be adequate (Beckermann 2015, 184–195). Similarly, there appear to be significant differences between western and eastern Swiss CWC. In the west, battle-axes appear in settlement contexts, single burials are almost lacking, pots in CW style just make up 10 % of all pottery, and the cords for the typical decoration even were wound oppositely (Wolf 1992, 195; Giligny – Michel 1995, 357). In the Czech Republic, communication and exchange systems remained stable (Kolář 2020, 1180). In the German low mountain range, crucial transformations took place in c. 3000 BC and the CWC was fully established in 2600 BC. Pottery traditions and rock art developed continuously without a break (Drummer 2022, 225). On the Danish Islands, aDNA evidence is almost lacking that either proves or disproves the migration models (Iversen 2015). However, a model of continuing interaction instead of a quick replacement is widely accepted (Iversen 2015; Egfjord *et al*. 2021, 11).

With these five examples, it is clear that one single model is not adequate for all regions, especially in those far away from CWC core areas. As long as we do not have clear evidence, we cannot just take the evidence of one region and put it on the other. In the study area, many continuities appear during the transition from the LN to the FN. This is particularly clear in SH, where landscape use remains stable, and megaliths and the enclosure were used continuously. Furthermore, the regional perspective shows that a decisive change in using battle-axes as grave gifts, already began in the LN. Presumably, a warlike identity was already present during the LN in many regions. The cultural continuities suggest a continuous influx of new people and ideas into Northern Germany, but no one-time massive migration. That is similar to the Danish Island. We should consider several migrations in loose networks and high individual mobility (Furholt 2019; 2021; Drummer 2022, 220).

Conclusions

To explain the super-regional CWC homogeneity, Furholt (2017) comes up with the concept of translocality. The more homogeneous the material culture appears in a given space, the more people had contact with each other (Furholt 2017, 115). For example, Kolář (2020, 1181) adopted this concept to explain the novelties and continuities in his research area. Intensive communication already took place on a pan-European level in the 4th millennium BC. The communication is shown, among other things, by the spread of the GAC as well as the symbolism connected to cattle and chariots (Johannsen *et al.* 2016, 48; Klimscha 2016, 86–91; Kaiser 2019, 94; cf. Heyd 2017). Battle-axes and the attached warlike identities testify to these supra-regional networks as well. Accordingly, the societies were organised trans-locally during the LN already. Within these networks, ideas and people moved.

Using the same "language" (i.e. similar battle-axes) during the LN potentially triggered the mobility of people between local groups. On this basis, new ancestry could spread quickly – completely without massive migrations, violent conquests, the spread of illnesses or a passive role of females. The genetic turnover did not happen as quickly as proposed by earlier studies. "*The speed and massiveness might be overexaggerated"* (Furholt 2021, 33). Neither the CWC itself nor the ancestry initiated the process. The examples of Schroeder *et al.* (2019), Papac *et al.* (2021), even show that CWC burial rites can occur independently from R1-genes. Accordingly, we must not evaluate the moment of the established change alone, but rather, we should investigate the time leading up to the changes. The super-regional networks and identities of the LN provided the framework for the rapid expansion of new ancestry and CWC symbols during the FN.

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Change or continuity in burial traditions between the TRB period and the Corded Ware culture? The case of Dalfsen, a Neolithic burial ground in the Netherlands

HENK VAN DER VELDE – NIELS BOUMA

Abstract

In 2015 in Dalfsen (Netherlands), a burial ground was excavated comprising 142 single burials. Most of them belong to the last phase of the TRB (Trichterbecher or Funnel Beaker) period (3000–2750 BC), and some to the Corded Ware and Bell Beaker cultures. The results from this excavation challenge existing ideas about the cultural break between the period of the TRB and that of the Corded Ware culture in the area associated with the TRB West group. Until now, the study of the TRB period has been mostly focused on megalithic monuments, and this has led researchers to perceive fundamental differences in burial custom between the TRB and Corded Ware periods. The results from Dalfsen show that the differences may be less fundamental than was previously thought. At Dalfsen, graves from the TRB period resemble those of the Corded Ware culture in many aspects except for their ceramics, and evidence for burial mounds and secondary burials was found dating to the period preceding the earliest introduction of Corded Ware pottery in the Netherlands. All of this suggests either that there was far more continuity in burial traditions from the TRB period to the Corded Ware culture period than has been suggested by recent studies or, alternatively, that prior to the introduction of Corded Ware pottery, Corded Ware culture ideas about burial rituals were already influencing the local community of Dalfsen.

Key words: *TRB period, Corded Ware culture, funerary archaeology, Dalfsen, Netherlands*

Introduction

During the first centuries of the 3rd millennium BC, the Corded Ware culture (known also as the Single Grave culture or the Battle Axe culture) spread over large parts of Europe, replacing (as it did in the Netherlands) the cultural groups of the *Trichterbecher* (henceforth TRB), or Funnelbeaker, culture (*Fig. 1*). The debate about the nature of the Corded Ware culture has a long history, in which the resemblances between material complexes are stressed and the distribution of the Corded Ware pottery is seen as a sign of cultural unity (Furholt 2019). When aDNA studies on the biological ancestry of inhumations pointed to an influx of groups from the Yamnaya culture into Europe, the debate on human mobility moved into a new phase (Kristiansen *et al.* 2017; Olade *et al.* 2018; Furholt 2021). Today, few archaeologists question the grand narrative of groups with a steppe ancestry migrating into and through Europe. In fact, several studies interpret these migration events as the start of a new era in many parts of Europe, represented in the northern and north-western parts by the emergence of the Corded Ware culture (Kristiansen *et al.* 2017; Furholt 2021; Papac *et al.* 2021). This archaeological culture replaced the TRB culture, whose members, as indicated by the results from the considerable number of inhumations analysed by means of aDNA, bear a haplo-group that they inherited from Mesolithic hunter-gatherer societies (Sánchez-Quinto *et al*. 2019). A closer look at the material culture, however,

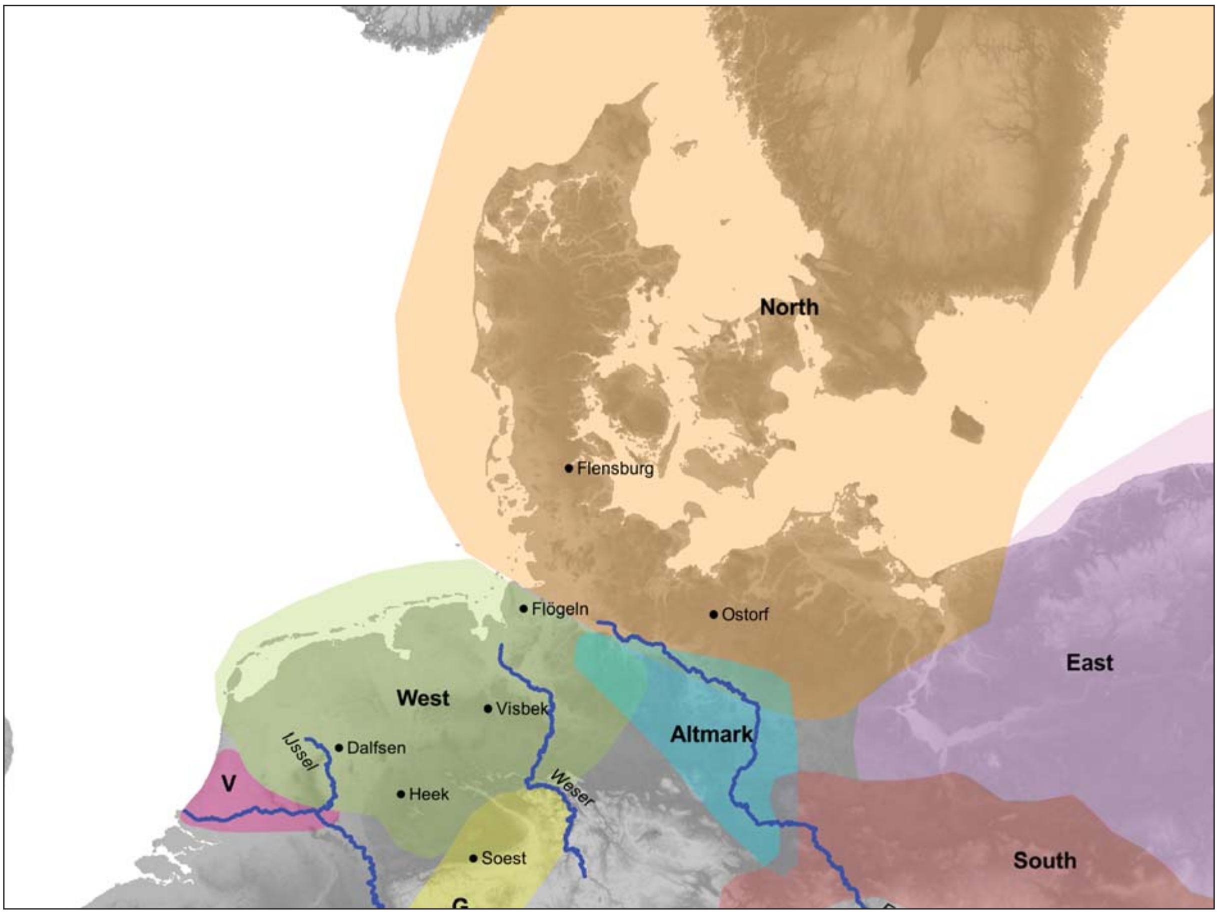
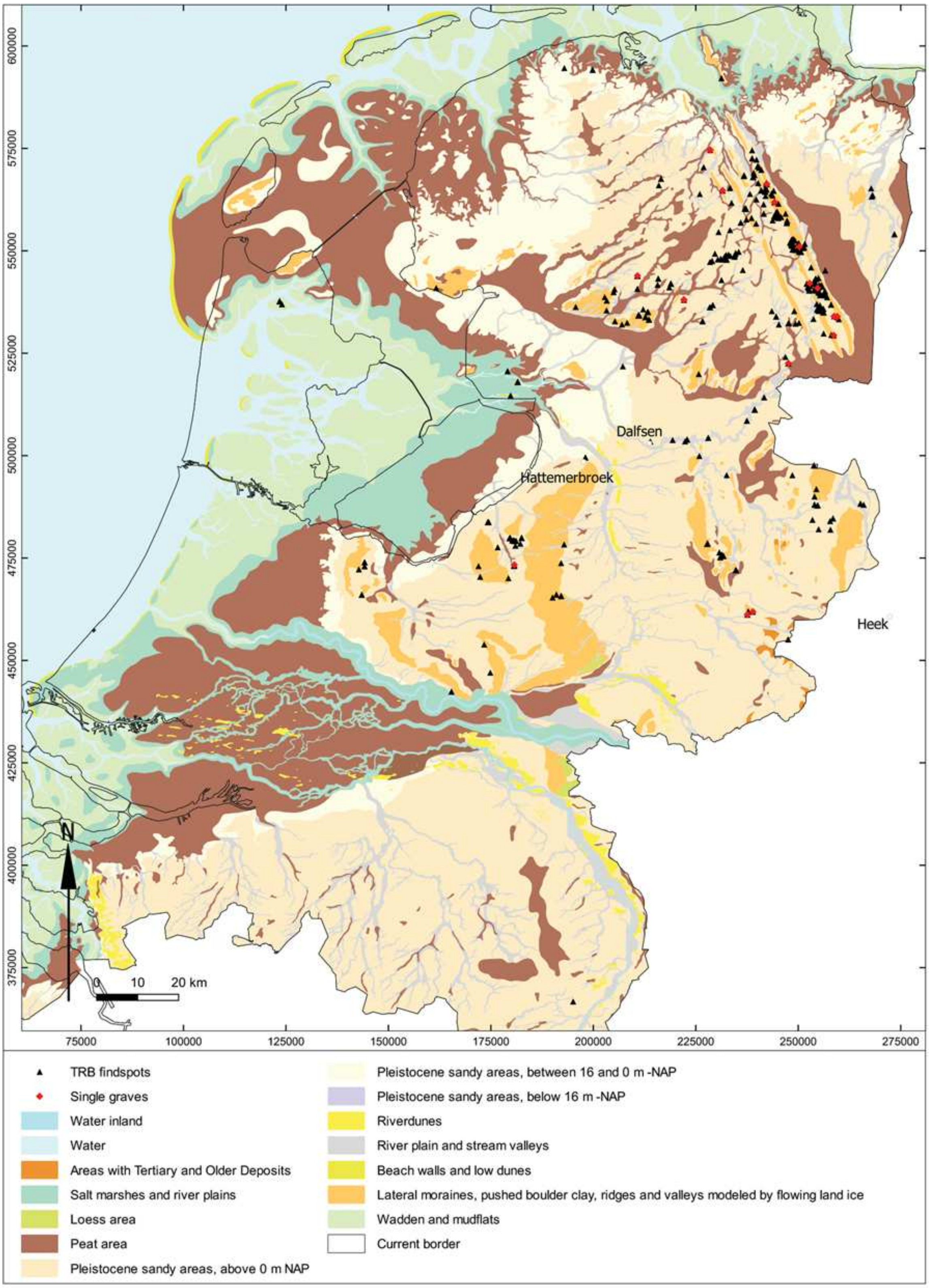


Fig. 1. TRB and Corded Ware culture groups in (northern) Europe (after Bakker 1979)

suggests that the Corded Ware culture also represents a variety of regional cultural groups, of people who have a pottery style in common but who differ in other aspects of their (im)material culture (Furholt 2019). This may suggest that the explanation that everything changed due to migrations is too simple.

At first glance, the material record (almost exclusively from burials) from both cultures seems to underline the differences between them. Usually, it is the contrast between a mortuary ritual involving megalithic monuments and collective burials (TRB) and a ritual involving single burials (Corded Ware culture group) that is stressed. When an excavation at Dalfsen (the Netherlands; *Fig. 2*) in 2015 uncovered a burial ground with 142 Neolithic burial pits, of which 135 date to the TRB period, the study of non-megalithic TRB burials entered the debate and challenged the idea that TRB burial sites are dominated by megalithic monuments (van der Velde – Bouma – Raemaekers 2019).

Even though the buried human remains had not been preserved in the acidic soils of Netherlands, the number of burials and the layout of the excavation made it possible to study burial rituals during the last phases of the TRB period (3000–2750 BC). Furthermore, by relying on the material culture of the burials, we were also able to compare the TRB flat graves and associated burial rituals to those of the Corded Ware culture. In this contribution, we first focus on the state of knowledge before the excavation at Dalfsen and then zoom in to the results from the excavation to find out whether the development of new cultural traditions relating to the Corded Ware culture group changed burial customs as dramatically as was previously thought.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Dalfsen
Hattemerbroek
Heek
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0
10
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TRB findspots
Single graves
Water inland
Water
Areas with Tertiary and Older Deposits
Salt marshes and river plains
Loess area
Peat area
Pleistocene sandy areas, above 0 m NAP
Pleistocene sandy areas, between 16 and 0 m -NAP
Pleistocene sandy areas, below 16 m -NAP
Riverdunes
River plain and stream valleys
Beach walls and low dunes
Lateral moraines, pushed boulder clay, ridges and valleys modeled by flowing land ice
Wadden and mudflats
Current border

Fig. 2. Location of Dalfsen (the province of Overijssel) and other TRB period find locations in the Netherlands (ADC ArcheoProjecten)

Mainly based on typochronological research, Brindley (1986) created a typology for pottery from the TRB West group that enables her (in combination with ^{14}C analyses) to date pottery within a timeframe of seven horizons, ranging from 3400 to 2750 BC. This typology (with some refinements by the same author) was used for the phasing of the Dalfsen pottery assemblage (Brindley 2022). Based on that typology, the oldest TRB graves from the burial ground at Dalfsen are thought to date to around 3000 BC and the youngest TRB graves from Dalfsen, to around 2750 BC. A small number of later, non-TRB burials were also found.

We would like to make clear that we do not question the evidence from aDNA and the dramatic changes that took place in Europe with the migration of steppe-originated groups. However, in this debate, archaeologists often tend to focus on the supra-regional level and to treat cultures as homogenous groups from which archaeological evidence may be compared – even if the find locations are situated hundreds of kilometres apart. This tendency is known from the study of both the TRB culture and the Corded Ware culture (e.g. Furholt 2014; 2019; Bourgeois – Kroon 2017). Here, we advocate an approach that favours focussing on more regional trends. We restrict the discussion to the TRB West group, located west of the river Weser, and in the Netherlands in particular (*Fig. 2*).

The chronology and typology of the Dutch Neolithic is still heavily based on the study of culture groups and the typochronological ordering of cultural material, such as flint artefacts and pottery (Fokkens – Steffens – van As 2016). Studies of pottery assemblages of several sites in the Western Netherlands led to the conclusion that pottery from 'different cultures' were found in contexts which could be chronologically ordered by ^{14}C datings (Beckerman 2015). This means that the timing of the end of the TRB culture in the north-eastern part of the Netherlands and the appearance of the first finds assemblages from the Corded Ware culture in that region are still a matter of debate. Estimates range from 2900 to 2750 BC (Lanting – van der Plicht 1999/2000; van den Broeke 2005). ^{14}C dating of material from the first sites with evidence of the Corded Ware culture suggests a date from the middle of the 29th century BC onwards (Lanting – van der Plicht 1999/2000; Beckerman 2011/12).

Despite the advances in ^{14}C chronologies, the study of the (Dutch) Neolithic is still mainly based on a succession of cultural groups that are characterised e.g. by their pottery. However, we must be very cautious in using material culture as being representative of cultures since the latter do not represent static concepts, but rather, dynamic constructs of cultural groups (Furholt 2021). Indeed, the overlap of nearly 150 years in which TRB and Corded Ware pottery are found together in the same region, although not in the same find contexts, challenges the idea of a neat chronology. This means that we must acknowledge that burial traditions from both cultural groups may have influenced each other.

The TRB culture and Corded Ware culture in the Netherlands

The complex mortuary practices of the TRB culture

The first megalithic monuments, known locally as *hunebedden*, appear in the Netherlands from 3400 BC onwards, a date based on ^{14}C dates from preserved organic material recovered from within the tombs themselves (Lanting – van der Plicht 1999/2000). The use of megalithic graves had started around 3600 BC in the neighbouring areas and seem to have reached the Netherlands – locating at the fringe of the TRB world – rather late (Midgley 2008; Müller 2011, 15). As the archaeological dataset of the TRB culture is dominated by these megalithic monuments, this is also where most of the research has been focused. The function of those monuments is interpreted as a location for collective burials (Bakker 1992; van der Velde – Bouma – Raemaekers 2022, 161).

The most striking element of the inventories of the megalithic burial chambers in the Netherlands is the huge number of finds – especially pots – recovered from within them. For example, the inventory of megalithic monument D53-Havelte comprises evidence for 1200 individual pots (Bakker 1992, 57), in contrast to the inventories of megalithic monuments northeast of the river Weser, which comprise far fewer finds (Midgley 2008, 139). Apart from the megalithic tombs, the dataset also comprises of a number of non-megalithic graves; three palisaded sites (Anloo, Hattemerbroek and Uddelermeer, all situated in the province of Gelderland) and several votive deposits (van der Sanden 1997). It must be noted though that not all the TRB period burials were inhumations, but cremated human bones (Jöns – Groenendijk – Raemaekers 2013) inhumation-size flat graves and cremation pits (Bakker – van der Waals 1973) are also recorded from these tombs. However, apart from one excavated settlement (Bouwlust, province of Noord Holland), we know almost nothing about TRB settlement sites and daily life (Raemaekers 2013; Peeters *et al.* 2017, 157). A recent inventory by Mennenga (2017) revealed a small number of house plans of different sizes (ranging from 8 m to 19 m in length) of which the houses with foundation trenches (as found at Flögeln and Heek) seem to be the most common type. At some of the settlement sites, flat graves have also been identified (Mennenga 2017).

Because the study of TRB societies is largely based on evidence derived from megalithic monuments, there are a number of points we must be aware of when looking at the archaeological record. First, excavations have focused on the burial chambers and the build-up of the burial mound. This has led to detailed knowledge about the building histories and inventories but leaves us in the dark about the use of the landscape surrounding the megalithic monuments. That large-scale excavation around the tombs may be essential to increase our understanding is best illustrated by the research conducted at Söderslätt, Sweden (Andersson – Wallebom 2013). This site provides evidence of palisaded routes of several hundreds of metres, of trenches with standing stones, of zones covered with stones, and of depositions in the neighbouring wetlands. Lack of excavations in the vicinity of the Dutch megalithic monuments means that we do not know if similar zones existed here as well.

Second, the focus on megalithic monuments has precluded any serious research on other aspects of TRB burial ritual. As a result, other features, such as burial mounds and flat graves, probably were, and still are, overlooked in archaeological and non-archaeological projects. This makes it impossible to estimate the true number of non-megalithic burials, although it is safe to say that they are heavily underrepresented in the archaeological record. An inventory of single burials compiled by Kossian (2005) makes it clear that these types of burials start to appear in the first phase of the TRB period although the majority date to the more recent phases.

Third, we do not know if the TRB groups made the same differentiation that we do between megalithic and non-megalithic monuments. Apart from the availability of stones being of importance to the choices made by local groups, it may well be that earthen mounds looked as impressive to them as megalithic monuments, most of which were originally covered by earth anyway and would have looked very similar from the outside (Midgley 2005). In his description of non-megalithic graves in Germany and the Netherlands, Kossian (2005, 61) creates a special category for stone cists, as being part of both the megalithic and the non-megalithic traditions, indicating that the two categories are perhaps not to be interpreted as separate entities. In fact, at the site of Mander (*Fig. 3*) traces of both a megalithic monument and single burials were found (Lanting – Brindley 2003/4). Finally, the fact that some cremation burials (such as that at Leer-Westerhammrich) date to the last phase of the TRB period has led researchers to believe that the burial custom changed from inhumation to cremation towards the end of the TRB period (Bärenfänger 2004; van Gijn – Bakker 2005).

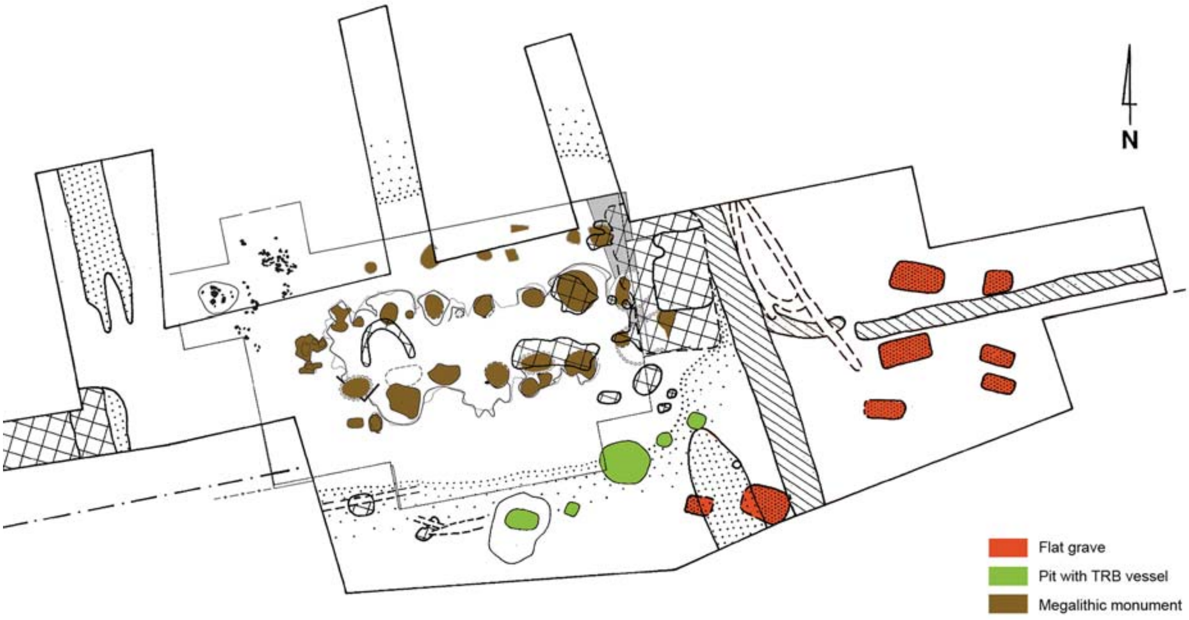

Fig. 3. Mander (province of Overijssel): traces of a megalithic monument and single burials (after Lanting – Brindley *2003/4)*

Corded Ware graves and funerary practices in the Netherlands

As is the case with studies on the TRB, studies on the Corded Ware culture in the Netherlands are also mainly focused on burial traditions. The burial ritual of the TRB West group involved the entire (local) community being buried together in a megalithic tomb. The end of the TRB period is seen as a watershed between collective burial and single burial (Wentink 2020). The single burials from the Corded Ware culture group are mostly found in isolation or as part of a small group of burials (Fokkens – Steffens – van As 2016, 299 ff). Here we discern two main lines of research. The first encompasses the study of burials including the so-called flat graves (cf. Bourgeois – Kroon 2017). The second addresses the archaeological evidence from burial mounds (Bourgeois 2013).

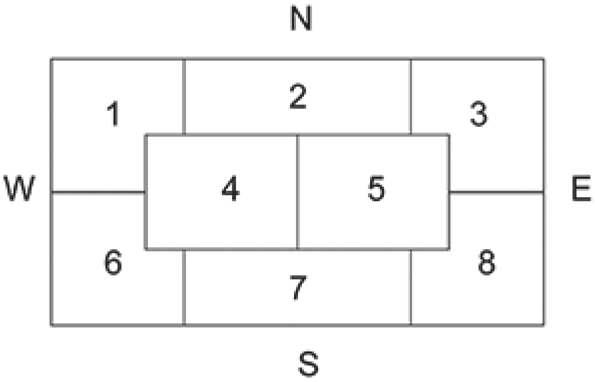

Fig. 4. The model used by Quentin Bourgeois *and Erik* Kroon *(2017) to code the locations of grave goods within single burials (after* Bourgeois – Kroon *2017)*

Regarding Corded Ware burials of northwestern Europe (including the Netherlands), Bourgeois and Kroon assembled a large dataset of 1061 burials (Bourgeois – Kroon 2017). They created a methodology to study the burial customs of this culture, based on the assumption that uniformity in ritual behaviour indicates a shared cultural background. Their research focused on the location of grave goods in relation to the position of the body, for which they used eight zones (*Fig. 4*). With their study, they demonstrated that the customs related to male burials were more uniform than the burial customs related to female burials.

The study of prehistoric burial mounds in Netherlands focuses more on the long-term development of this archaeological phenomenon (Bourgeois 2013). Most researchers state that the emergence of burial mounds in the research area starts in the 3rd millennium BC (Bourgeois 2013). In the Corded Ware culture, burial mounds played an important role in shaping the cultural landscape of that period and creating them may have been an important event in reinforcing group identity (Bourgeois 2013). This, not only during the first phase, involving the single (central) burial and the creation of a mound over top, but also during subsequent phases, involving secondary burials accompanied by heightening of the original burial mound (Bourgeois 2013). However, the relatively small numbers of burial mounds and single graves in relation to the estimated population size suggest that only part of the total population is archaeologicaly visible within the Corded Ware burial ritual (Bourgeois 2013, 12 ff).

The burial ground at Dalfsen during the TRB period

The village of Dalfsen is situated in the valley of the river Vecht. Parallel to this river, a string of coversand ridges formed, which have yielded a rich archaeological record dating from the Mesolithic to the recent periods of time (van der Velde – Bouma – Raemaekers 2022). The excavation at Dalfsen started at 2015 and led to the documentation of settlement features and burials dating to the Bronze Age and the Iron Age; a small, early medieval burial site; a high medieval farmstead; and, as mentioned already, a burial ground dating to the Neolithic period (Bouma – van der Velde 2017; van der Velde – Bouma – Raemaekers 2022). The Neolithic burial ground was situated on two sand ridges. The southern ridge, which bordered a branch of the river Vecht that is no longer extant, yielded 135 single graves from the TRB period, whereas the northern sand ridge yielded traces of a house plan from the TRB period, as well as two single burials from the Corded Ware culture and five burials from the Bell Beaker culture (2400–2000 BC), including one covered by a burial mound (*Fig. 5*).

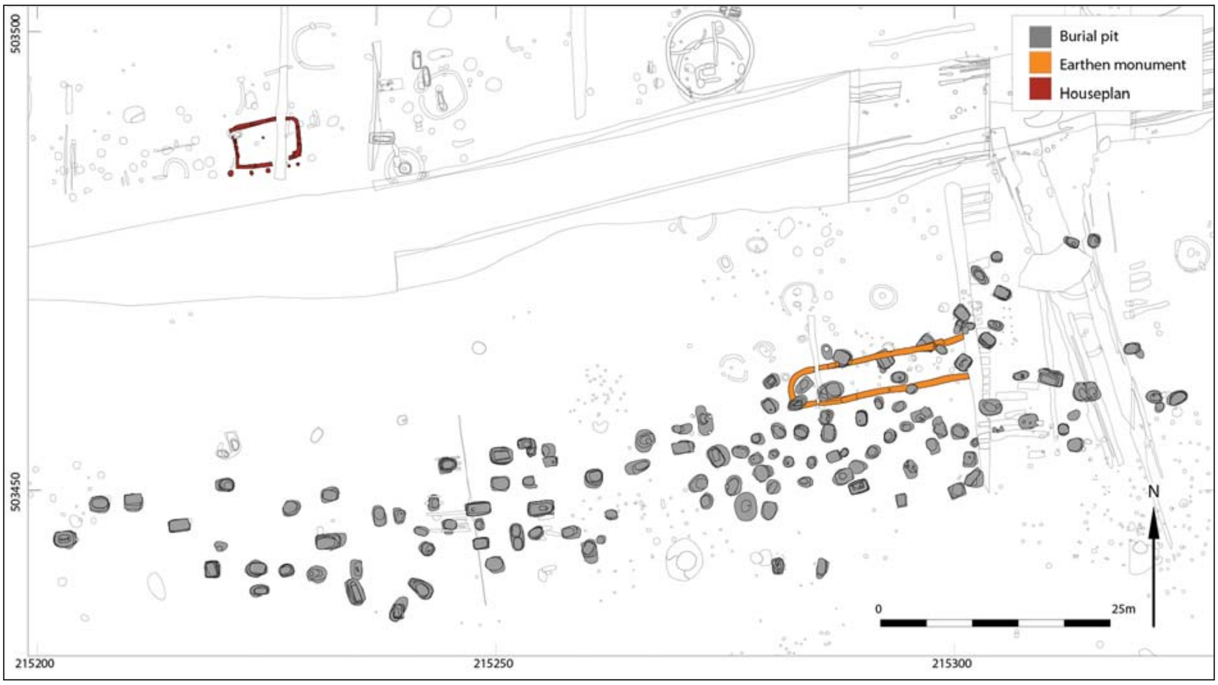

Fig. 5. Overview of the Dalfsen burial ground (ADC ArcheoProjecten)

Most of the grave pits yielded grave goods, among which pottery was the most prominent. The pottery spanned Brindley phase 4 to Brindley phase 7 (Brindley 1986); we were therefore able to date the burial ground to 3000–2750 BC. Based on the grave pits that could be dated by studying the ceramics, it was possible to reconstruct the development of the layout of the burial ground. As shown in *Fig. 6*, the burial ground started with a cluster of 13 grave pits during Brindley phase 4 (3235–2975 BC). At the start of phase 5 (2975–2850 BC), new graves were added, and a monumental structure was constructed (*Fig. 7*). We were able to reconstruct three periods of use for this monumental structure. During the first phase, an oval ditch was dug, enclosing a space of 25 by 3.5 metres in which a number of pits were found. This (short-lived) phase is interpreted as a ritual monument. During the second phase of development (still corresponding to Brindley phase 5), an earthen monument was erected, and the ditch was filled in. This earthen monument became the focal point of the burial ground and people were buried in it (phase 3). It acted also as a focal point during the later Neolithic and the Bronze Age. Both the burial mound (dating to the Bell Beaker period) and the later cremation burial site (dating to the Bronze Age and the Iron Age) were focused on this earthen monument. It is interesting to note that, once this earthen monument had been added to it, the burial ground may well have had an appearance not so different from, for instance, the TRB burial ground of the above-mentioned megalithic site of Mander (Lanting – Brindley 2003/4). Already during phase 5, and continuing into the succeeding phases, grave pits were dug into the earthen monument. The earthen monument gained in height as a result of this later activity, but it is difficult to establish if this was the intention or just the consequence of digging new burials into it.

Apart from the grave pits cut through the ditch of the earthen monument, no disturbances of earlier grave pits by more recent ones were recorded, so we can infer that the location of these graves must have been visible and respected by the local community who used this burial ground. Some of them may well have been covered by a mound. Although, no traces of the base of a burial mound were found, two circular structures can nonetheless be reconstructed (*Fig. 8*). At the centre of both structures was a grave pit dating to Brindley phase 4. In both cases, a ring of grave pits dating to Brindley phase 5 encircled the primary grave. It is striking that some of these secondary graves were dug to a lesser depth than the

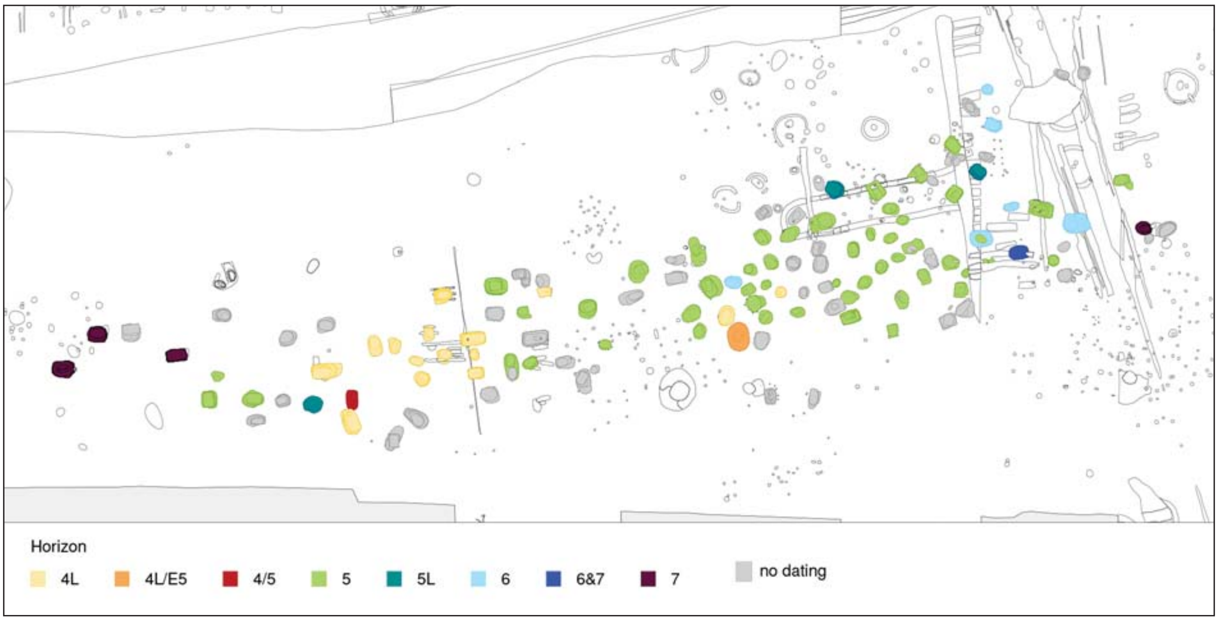

Fig. 6. Development of the Dalfsen burial ground (ADC ArcheoProjecten)

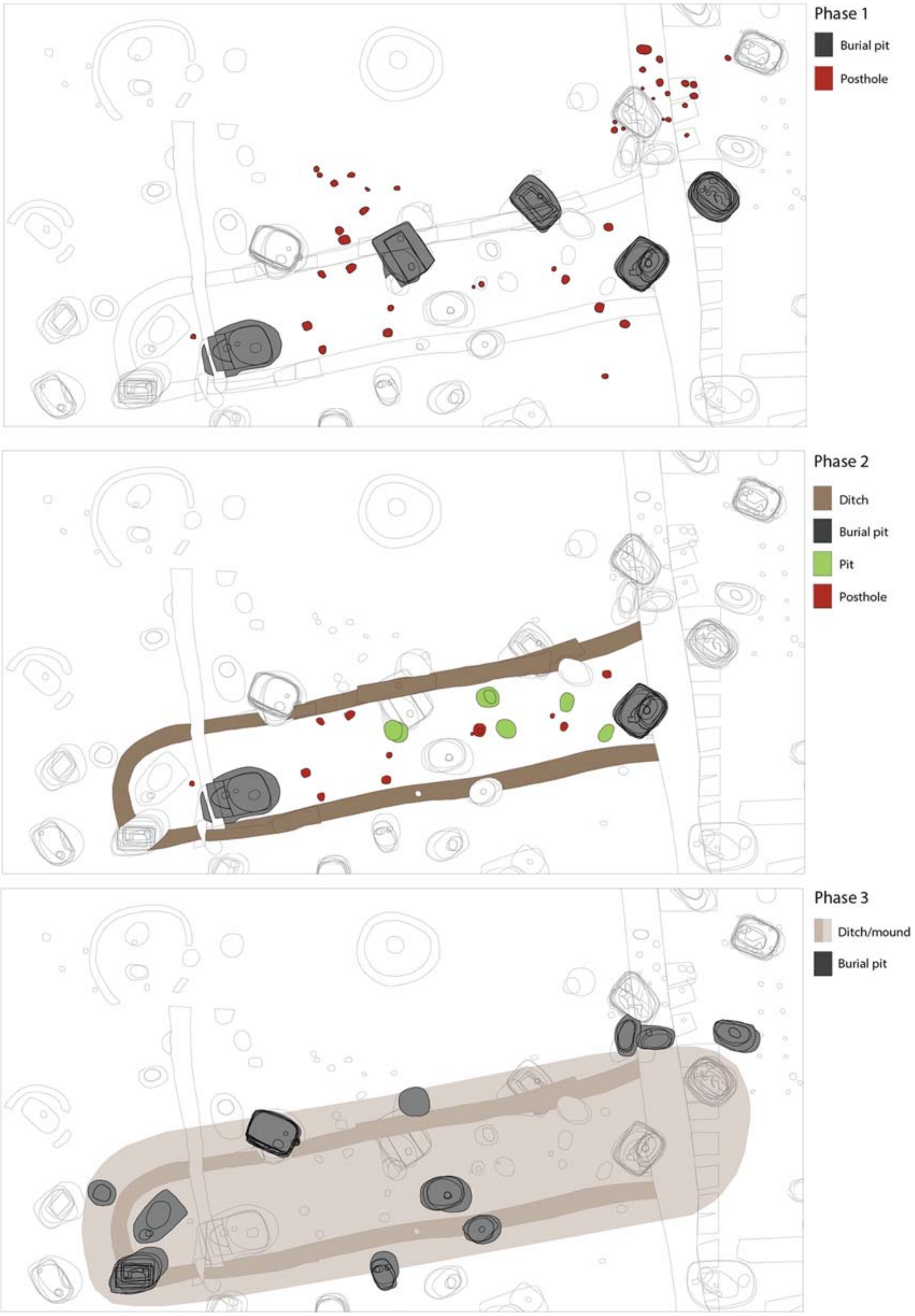

Fig. 7. Different phases of use of the Dalfsen earthen monument (ADC ArcheoProjecten)

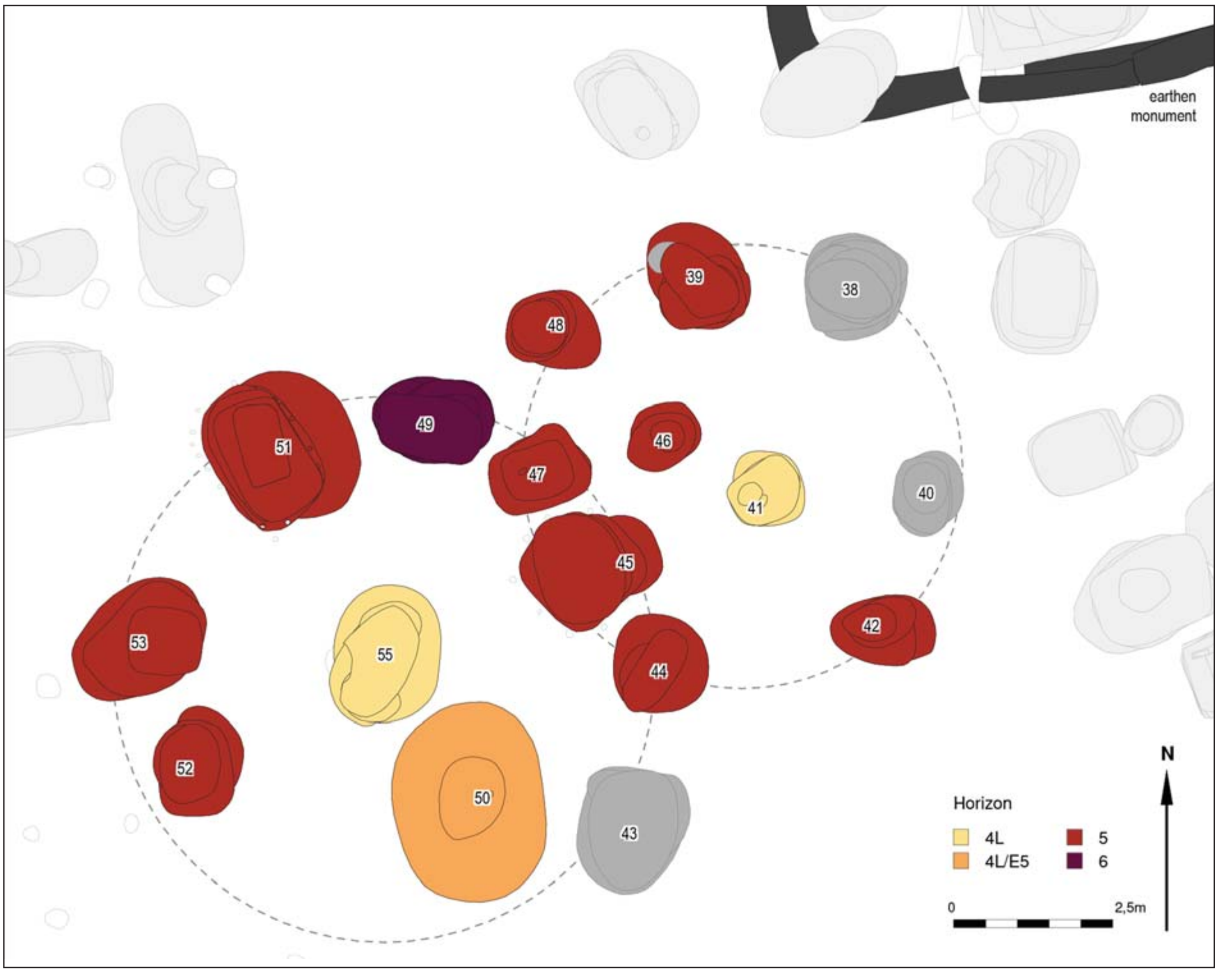

Fig. 8. Reconstruction of Dalfsen circular structures that likely represent the location of completely eroded burial mounds (ADC ArcheoProjecten)

primary, central burial. This leads us to conclude that both circular structures represent mounds in which a later generation chose to bury their dead.

Except for one cremation burial, the burials from the TRB period consisted of inhumation burials dug underground. Although no human bone was preserved, the silhouettes of the decomposed human burials were visible in a number of pits (in total 16 silhouettes were preserved). This made it possible to reconstruct the layout of some of the grave pits. Almost all silhouettes indicate that the deceased was buried in a lateral position, on their left side, with knees bent (i.e. in flexed [German: *hocker*] position). One body silhouette may represent a person laid on their right side, but we cannot be certain of this. The width of the silhouette in grave 82 suggests that the body in that grave was wrapped in a shroud. The orientation of the body silhouettes differs widely and follows the orientation of the grave pits. Whereas the orientation of the grave pits is east–west, the orientation of the body silhouettes within them varies. Body silhouettes oriented northwest–southeast and west–east comprise 50% of the total, indicating that burial with the head position in the northwest or west was relatively popular, but not prescribed. The body silhouettes are not detailed enough to say anything about the sex of the deceased. However, it is possible to estimate the body length, which may be used to distinguish between adults and children.

Most body silhouettes measured between 1.30 and 1.60 m in length, indicating the burial of adults and somewhat older children.

Based on the number of graves and on portable X-ray fluorescence (pXRF) analysis of the pottery fabric, we assume that during the TRB period, the burial ground held almost all members of the local group (Raemaekers – van der Velde 2022), which we understand to mean a couple of families. This is because, apart from a few outliers, the pottery forms a remarkably uniform group, which most probably means that the raw material for almost all pots was sourced, and hence almost all pots were made, within a small region (Struckmeyer – van Os 2022). We have therefore dismissed an alternative interpretation that the burial ground was of special regional importance and that people came to Dalfsen from a wide area to bury some of their deceased, based on selection criteria unknown to us.

Although the material from Dalfsen is too small for statistical analyses, we partly applied the methodology developed by Bourgeois and Kroon (2017) to explore the positioning of the grave goods in accordance with the buried body (Bouma – van der Velde 2022). Due to the near absence of body silhouettes, a generalisation of the Bourgeois and Kroon approach was needed that acknowledges the uncertainty around the position of the head. We concluded that zones 1, 3, 6 and 8 represent the corners of the grave pit; zones 2 and 7 border the long axis; and zones 4 and 5 constitute the centre. We were unable to distinguish specific zones in which only one type of grave good was deposited. However, for pottery, there seems to have been a preference for the central part of the grave pit and the southeast corner. Half of the ceramics were found in the centre of the grave pits, zones 4 and 5 from the study of Bourgeois and Kroon (2017). Zones 2 and 7, along the long sides of the pits, contain the smallest proportion of finds (6% combined). The corner zones contain c. 44% of the ceramics, and there are noticeably more in the east corners (zones 3 and 8; 29% combined) than in the west corners (zones 1 and 6; 15% combined). The two stone axes recovered from Dalfsen were both found in the eastern part of the grave.

The above-mentioned analysis was carried out using the grave pit as the spatial context, but in the graves with wooden coffins, the analysis was adapted to this more restricted space. We therefore employed a ninth zone, which is addition to the zones published by Bourgeois and Kroon (2017): outside the coffin but inside the grave pit. This is not just a theoretical option for the deposition of grave goods: two graves (92 and 99) each yielded a pot that had been placed outside the coffin, in a separate, small pit.

Burials related to the Corded Ware culture and Bell Beaker groups at Dalfsen

On the contrary to TRB burials, we discovered only a few post-TRB burials from the Dalfsen site. These burials – consisting of seven burial pits and a burial mound – were all situated on another sand ridge, opposite the TRB burial ground. One of the grave pits dating to the Corded Ware culture was cut at the corner of a house plan from the TRB period. The oval grave pit did only contain a flint blade dated to the Corded Ware Culture. During the excavation no silhouettes were found but a closer look at the photographs from the excavation made it possible to reconstruct two silhouettes on their left, in flexed position, facing north. This location of the grave suggests that the community burying the dead recognised the layout of the building, which may mean that the interval between the last TRB burial and the first Corded Ware culture burial was not very long.

Four burials seem connected to the location of the burial mound of which only several (traces of) ring ditches were found (*Fig. 9*). In one of those ditches a small pottery fragment dating from the Bell Beaker period was found. Another fragment of Bell Beaker pottery was found in one of the grave pits.

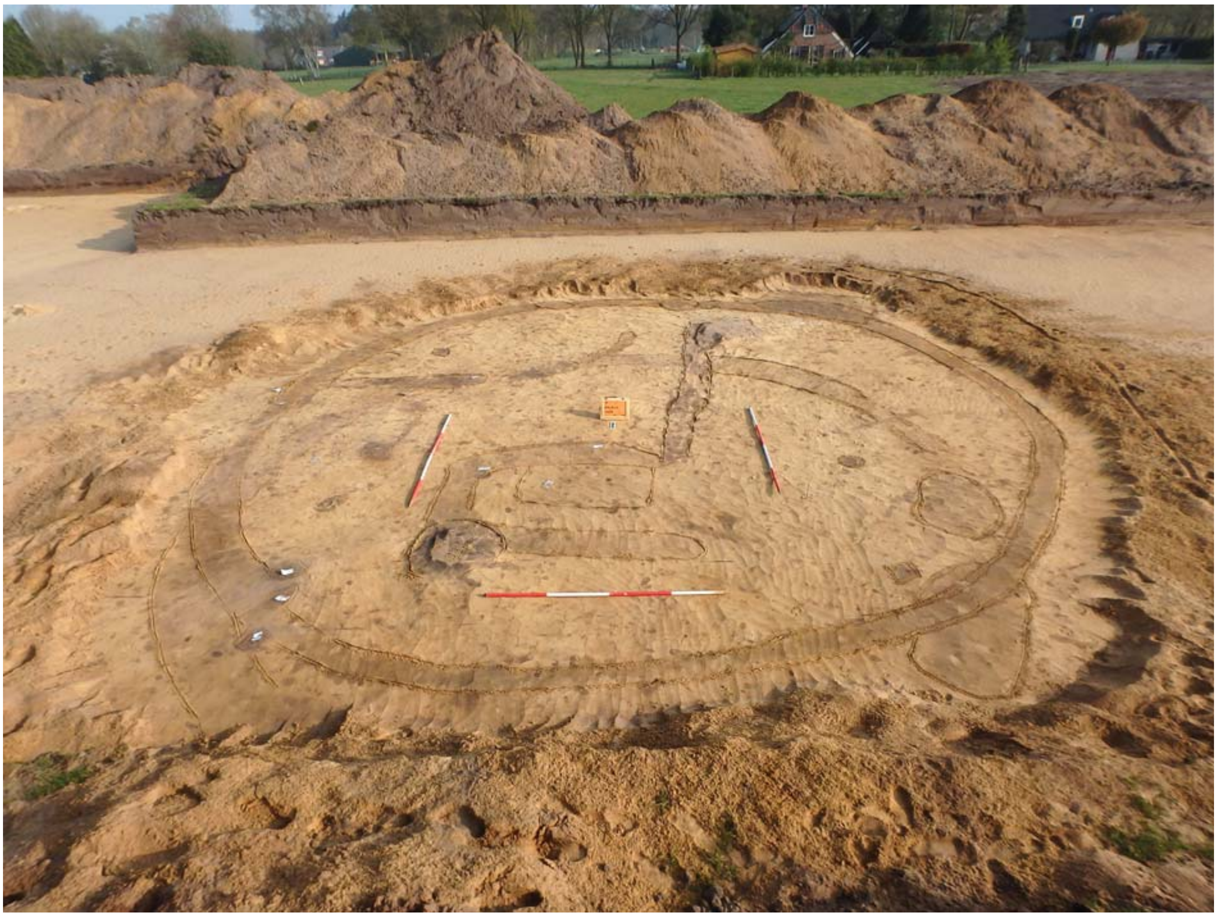

Fig. 9. Overview of the Dalfsen Late Neolithic burial features (ADC ArcheoProjecten

Two grave pits contained no finds nor visible silhouettes, but their form suggest that the deceased most probable were buried in a crouched position. Also, the fourth grave pit did not contain finds but features of wooden coffin were visible. This in combination with the silhouette of the head and arms suggest the deceased was positioned on its back. The location of the graves suggests, on the one hand, a continuity in burial tradition (still focused on the former TRB burial site) and, on the other hand, the creation of physical distance between the two communities. In addition, the fact that the number of burials from the Corded Ware culture and the Bell Beaker culture (as represented by a burial mound and four secondary burials opposite the earthen monument) is small, leads us to conclude that only a small proportion of the local Corded Ware and Bell Beaker culture community was buried there.

The number of post-TRB burials is too small to allow for a statistically valid comparison with the TRB burial tradition. Furthermore, because the dating of the TRB burials at Dalfsen partly overlaps the beginning of Corded Ware period in the Netherlands, Dalfsen is not the site where we can resolve questions about the end of the TRB culture and the start of the Corded Ware culture in the north-eastern part of the Netherlands either. However, the archaeological data retrieved from the burial ground at Dalfsen makes it possible to address questions about continuity and discontinuity between the TRB and Corded Ware periods. With this new evidence, we can also challenge some of the existing theories on the nature of the burial ritual of the TRB period compared with the following period.

Within the literature, most of the attention is given to the dichotomy between individual and collective burial in relation to the TRB and Corded Ware periods (van Gijn – Bakker 2005). However, the Dalfsen data indicate that burials of the TRB West group may have been of a more individual nature than previously thought (Raemaekers – van der Velde 2022). This is indicated not only by the single burials but also when we look more closely at the find complexes from the megalithic tombs from the TRB period. Indeed, if we compare the find complex of the total of the burial pits from Dalfsen with the find complexes from several Dutch megalithic tombs we notice similarities in the number of grave goods (Raemaekers – van der Velde 2022). The number of finds compared to the years that those megalithic tombs were in use suggest similarities in burial custom where only limited number of grave goods pro person may have been the norm. This may indicate that those megalithic tombs also accommodated entire communities, and that although the deceased were buried in a collective burial chamber, the burial ritual itself was still of an individual nature (Raemaekers – van der Velde 2022). Also, several single burials known from the TRB West group elsewhere pre-date even those at Dalfsen (Kossian 2005). This is an indication that the custom of single burials is already part of the TRB-burial tradition before the emergence of the Corded Ware culture.

It must be noted though that burial grounds such as that at Dalfsen may also represent a regional variation on burial custom only present in the TRB West group. Indeed, even though the Dalfsen burial ground is unusual in terms of high number of graves, there are 193 find locations of single inhumation burials in the TRB West group area (Kossian 2005). In other words, Dalfsen is not unusual in terms of the nature of the burial ground. Although the Dalfsen burials and Corded Ware burials in general share common ground in the tradition of a single inhumation burial, the data from Dalfsen also suggest a difference between the TRB and Corded Ware periods in the number of burials. During the TRB period, the burial ground at Dalfsen likely comprised all members of the local society and in that sense was collective in nature, something which (given the present state of knowledge) cannot be said about the burial complexes from the Corded Ware culture (Bourgeois 2013). For example, only some members of the society seem to have been buried underneath burial mounds while most single burials are found as solitary burials or as part of a small group of burials (Bourgeois 2013). Burial mounds at Dalfsen were created during Brindley phase 4, and these were subsequently reused for new burials during Brindley phase 5 (2975–2850 BC), a period with no indications for the presence of groups from the Corded Ware culture in this part of north-western Europe.

To our mind, there are three possible answers to the question about continuity or change posed in the title of this paper. The first possible answer is that, around 3000 BC, the local TRB community was influenced by new ideas about burial ritual associated with the Corded Ware culture. The community members chose to bury their dead in single burial pits and introduced the idea of constructing burial mounds. At the same time, they still used their own, TRB pottery as grave goods. The second possible answer is that these single grave burial rituals already existed in the TRB culture and that the incoming Corded Ware communities were (partly) influenced by them. This line of interpretations is supported further by the fact that the introduction of Corded Ware burials in the Netherlands took place more than a century after the first phase of the Dalfsen burial ground. The third possible answer is that Dalfsen is a burial ground in which burial traditions from both cultural backgrounds, TRB and Corded Ware, mingled and influenced each other.

Conclusions

The burial ground at Dalfsen stands out as the largest known burial ground of the TRB period containing single burials. The first phase revealed single burials containing TRB ceramics, and these burials predate what, until our work at Dalfsen, were the earliest known single burials – associated with the Corded Ware culture – in the Netherlands. Although there are differences between the burial customs of the TRB and Corded Ware periods within the archaeological record of the TRB burial ground at Dalfsen, we also notice similarities in the burial custom itself (position of the body, location of the grave goods) and in the creation of burial mounds.

However, on the basis of the current state of knowledge, it is not possible to conclude whether these noted similarities in burial custom can be interpreted as a sign of (regional) continuity from the TRB period into the Corded Ware period or as a first glimpse of the changes in burial custom that occurred under the influence of incoming ideas from the Corded Ware culture groups. Accordingly, more research on the (almost forgotten group of) single burials from the TRB period, alongside a programme of dating the Corded Ware burials, may help us in the near future to establish whether the archaeological record is the result of continuity, change or a mixture of both.

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